

**PTI** Environmental Services  
3625 - 132nd Avenue S.E.  
Suite 301  
Bellevue, Washington 98006

SEP 3 1988

FINAL REPORT

LC

Superintendent

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## **ELLIOTT BAY ACTION PROGRAM: 1988 ACTION PLAN**

---

Prepared for

Tetra Tech, Inc.  
11820 Northup Way N.E.  
Bellevue, Washington 98005  
and  
U.S. Environmental Protection Agency  
Region X - Office of Puget Sound  
Seattle, Washington 98101

EPA Contract No. 68-02-4341  
Tetra Tech Contract No. TC-3338-23  
PTI Contract No. C717-02

September 1988

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## GLOSSARY AND LIST OF ABBREVIATIONS

### AGENCY AND PROGRAM NAMES

|           |  |
|-----------|--|
| CAC       | Citizens Advisory Committee  |
| CATAD     | Computer- Augmented Treatment and Disposal System used by Metro to control flows and locations of combined sewer overflows   |
| CERCLIS   | Comprehensive Environmental Response, Compensation and Liability Act Information System  |
| COE       | U.S. Army Corps of Engineers   |
| EBAT      | Elliott Bay Action Team  |
| Ecology   | Washington Department of Ecology   |
| EPA       | U.S. Environmental Protection Agency   |
| IAWG      | Interagency Work Group   |
| Metro     | Municipality of Metropolitan Seattle   |
| NOAA      | National Oceanic and Atmospheric Administration  |
| NPDES     | National Pollutant Discharge Elimination System (EPA/Ecology)  |
| PA/SI     | Preliminary assessment/site investigation under Superfund  |
| PSDDA     | Puget Sound Dredged Disposal Analysis  |
| PSEP      | Puget Sound Estuary Program (EPA/Ecology/PSWQA), including urban bay action programs such as the Elliott Bay Action Program  |
| PSWQA     | Puget Sound Water Quality Authority  |
| RCRA      | Resource Conservation and Recovery Act   |
| RI        | Remedial investigation   |
| SPCC      | Spill prevention, control, and countermeasures   |
| Superfund | EPA and Ecology programs under the federal Comprehensive Environmental Response, Compensation and Liability Act to clean up hazardous waste sites and other areas of toxic contamination |

## **CHEMICAL NAMES**

|      |  |
|------|--|
| Al   | Aluminum   |
| As   | Arsenic  |
| CN   | Cyanide  |
| Cu   | Copper   |
| HPAH | High molecular weight polycyclic aromatic hydrocarbons |
| LPAH | Low molecular weight polycyclic aromatic hydrocarbons  |
| PAH  | Polycyclic aromatic hydrocarbons                       |
| Pb   | Lead   |
| PCBs | Polychlorinated biphenyls                              |
| Zn   | Zinc   |

## **POLLUTANT SOURCE NAMES**

|         |  |
|---------|--|
| CSO     | Combined sewer overflow - a discharge of raw sewage diluted with stormwater, which occurs whenever the hydraulic capacity of a combined sewer line is exceeded       |
| CSO/SD  | Combined sewer overflow and storm drain - a combined source that discharges storm drainage during low flows and raw sewage diluted with stormwater during high flows |
| MH      | Manhole  |
| O/W sep | Oil/water separation or oil/water separator  |
| SD      | Storm drain - a source of stormwater discharge only  |
| SRO     | Surface runoff   |
| TSD     | Treatment, storage, and disposal (of hazardous waste) facility   |
| UST     | Underground storage tanks  |

## **OTHER TERMS**

|     |  |
|-----|--|
| AET | Apparent effects threshold. Chemical concentrations in sediment above which a particular adverse biological effect is expected to be statistically significant ( $P < 0.05$ ) relative to appropriate reference conditions. Several AET (based on more than one biological effect) may be developed for a single chemical. |
|-----|--|

|                 |   |
|-----------------|---|
| Amphipod        | A small organism that superficially resembles a shrimp and lives on the sea bottom. Amphipods are used in laboratory bioassays to test the toxicity of sediments.   |
| Benthic         | Pertaining to the bottom of a water body.   |
| Bioaccumulation | The accumulation of a substance in tissues of an organism. Bioaccumulation of toxic substances may lead to disease or other health problems and may render organisms unfit for human consumption.   |
| Bioassay        | A laboratory test used to evaluate the toxicity of a material (commonly sediments or wastewater) by measuring behavioral or physiological responses (including death) of organisms.   |
| Community       | A group of interacting species populations found within a defined area.   |
| Diversity       | The number of species in a community, or a mathematical index of the variety of species that also accounts for the relative abundance of each species.  |
| Dominance       | An index that measures the relative distribution of individuals among species. When dominance is high, a few species are very abundant and others are rare.   |
| EAR             | Elevation above reference. A measure of toxic contamination or biological effects that is equal to the value of a variable (e.g., chemical concentration) at a study site divided by the value of the same variable at a relatively clean reference area. |
| GPD or GPY      | Gallons per day or gallons per year.  |
| HAET            | High apparent effects threshold. The highest of several AET developed for a single contaminant.   |
| Histopathology  | Study of tissue lesions.  |
| HNu             | A type of photoionization detector that measures combustible gas concentrations in air.   |
| Infauna         | Animals living within the bottom sediments.   |
| Invertebrates   | Animals without backbones.  |
| LAET            | Low apparent effects threshold. The lowest of several AET developed for a single contaminant.   |
| Larvae          | (singular: larva) - A juvenile stage of an invertebrate with a body form that differs greatly from the adult stage (e.g., an oyster larva is a small, free-floating organism).  |
| Lesion          | An abnormal structural change in the body due to injury or disease (e.g., a liver tumor in fish).   |



|                     |   |
|---------------------|---|
| Loading             | Quantity of a substance that enters a water body during a specified time interval (e.g., pounds per year).                                  |
| mg/kg or mg/L       | Milligrams per kilogram or milligrams per liter, a measure of concentration of a contaminant [also referred to as parts per million (ppm)]. |
| ND                  | Not detected, or below detection limits.  |
| Nonpoint Source     | A nonspecific source of pollutants, often from a large area (e.g., stormwater drainage).  |
| Pathology           | Study of disease.   |
| ppb                 | Parts per billion (see ug/kg or ug/L).  |
| ppm                 | Parts per million (see mg/kg or mg/L).  |
| Sediment            | Material that settles to the bottom of a water body or collects on the bottom of pipes such as sewers and storm drains.                     |
| Toxic               | Relating to a poisonous substance.  |
| Toxic Contamination | Presence of toxic substances, often caused by release of metals or synthetic organic chemicals to the environment.                          |
| ug/k or ug/L        | Micrograms per kilogram or micrograms per liter, a measure of concentration of a contaminant [also referred to as parts per billion (ppb)]. |

## ACKNOWLEDGMENTS

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The primary authors of this report are Mr. Pieter Booth and Dr. Robert Pastorok of PTI Environmental Services. Ms. Beth Schmoyer of the Washington Department of Ecology provided source-related information for Table 1 and Appendixes B and C. Dr. Jean Jacoby of Tetra Tech, Inc. and Dr. Thomas Ginn of PTI Environmental Services provided technical review comments.

The Elliott Bay Action Program has benefited from the participation of an Interagency Work Group and a Citizens Advisory Committee. Duties of the Elliott Bay Interagency Work Group and Citizens Advisory Committee members included: 1) reviewing program documents, agency policies, and proposed actions; 2) providing data reports and other technical information to the U.S. Environmental Protection Agency; and 3) disseminating action program information to interest groups or constituencies. The past and continuing efforts of the Elliott Bay Interagency Work Group and Citizens Advisory Committee members are greatly appreciated. Special thanks are due to Ms. Joan Thomas, Mr. Gary Brugger, and Mr. Dan Cargill for chairing the Elliott Bay Interagency Work Group and to Mr. David Schneider and Ms. Janet Anderson for co-chairing the Elliott Bay Citizens Advisory Committee. Members of the Elliott Bay Interagency Work Group and Citizens Advisory Committee are listed below.

### Elliott Bay Interagency Work Group

| <u>Name</u>           | <u>Affiliation</u>                              |
|-----------------------|---|
| Mr. Dave Aggerholm    | Port of Seattle                                 |
| Dr. John Armstrong    | U.S. Environmental Protection Agency            |
| Mr. Morgan Bradley    | Muckleshoot Tribe                               |
| Mr. Gary Brugger      | Washington Department of Ecology                |
| Ms. Martha Burke      | U.S. Environmental Protection Agency            |
| Mr. Dan Cargill       | Washington Department of Ecology                |
| Ms. Lori Cohen        | U.S. Environmental Protection Agency            |
| Ms. Lee Dorigan       | Washington Department of Ecology                |
| Ms. Nancy Ellison     | Washington Department of Ecology                |
| Dr. Richard A. Feeley | National Oceanic and Atmospheric Administration |
| Mr. Jay Field         | National Oceanic and Atmospheric Administration |
| Mr. Skip Fox          | National Oceanic and Atmospheric Administration |
| Ms. Annette Frahm     | Puget Sound Water Quality Authority             |
| Dr. Jack Gakstatter   | U.S. Environmental Protection Agency            |
| Mr. Douglas Hotchkiss | Port of Seattle                                 |
| Mr. Tom Hubbard       | Municipality of Metropolitan Seattle            |
| Mr. Gary Irvine       | Seattle-King County Department of Public Health |

### **Elliott Bay Interagency Work Group (continued)**

| <u>Name</u>          | <u>Affiliation</u>                                  |
|----------------------|---|
| Dr. David Jamison    | Washington Department of Natural Resources          |
| Mr. Richard Koch     | Washington Department of Ecology                    |
| Mr. Michael Kuntz    | Washington Department of Ecology                    |
| Ms. Jane Lee         | Seattle-King County Department of Public Health     |
| Mr. Edward Long      | National Oceanic and Atmospheric Administration     |
| Mr. Cliff Marks      | City of Seattle                                     |
| Dr. Lawrence McCrone | Washington Department of Ecology                    |
| Mr. Keith Rose       | U.S. Environmental Protection Agency                |
| Ms. Clare Ryan       | Washington Department of Ecology                    |
| Mr. Carl Sagerser    | Washington Department of Social and Health Services |
| Mr. Tim Sample       | Municipality of Metropolitan Seattle                |
| Ms. Beth Schmoyer    | Washington Department of Ecology                    |
| Mr. Martin Seybold   | King County   |
| Mr. David Smith      | Washington Department of Ecology                    |
| Ms. Mary Lou Soscia  | U.S. Environmental Protection Agency                |
| Mr. Joe Talbot       | City of Seattle                                     |
| Mr. Neil Thibert     | City of Seattle                                     |
| Ms. Joan Thomas      | Washington Department of Ecology                    |
| Mr. John Underwood   | U.S. Environmental Protection Agency                |
| Mr. Frank Urabeck    | U.S. Army Corps of Engineers                        |
| Dr. Fred Weinmann    | U.S. Army Corps of Engineers                        |

### **Elliott Bay Citizens Advisory Committee**

| <u>Name</u>               | <u>Affiliation</u>                     |
|---------------------------|--|
| Ms. Janet Anderson        | Magnolia Community Club                |
| Mr. Douglas Briggs        | Puget Sound Industrial Council         |
| Ms. Harriett Bullitt      | Friends of the Duwamish                |
| Ms. Virginia Van Engelgen | League of Women Voters                 |
| Mr. Donald Hamilton       | Seattle Poggie Club                    |
| Mr. James Heil            | Puget Sound Alliance                   |
| Mr. Paul Hickey           | Muckelshoot Indian Tribe               |
| Ms. Dee Ann Kirkpatrick   | Suquamish Indian Tribe                 |
| Mr. Minor Lile            | Greater Seattle Chamber of Commerce    |
| Mr. Charles Muller        | Sierra Club                            |
| Mr. James Puckett         | Puget Sound Alliance                   |
| Mr. Tom Putman            | Seattle Audubon Society                |
| Ms. Annette Ramsour       | Washington State Sports Diving Council |
| Mr. David Schneider       | Seattle Marine Business Coalition      |
| Ms. Diana Swain           | Port Watch                             |
| Mr. Terry Thomas          | Northwest Steelhead and Salmon Council |
| Mr. Mike White            | Northwest Marine Trade Association     |
| Mr. Robert Williscroft    | Washington State Sports Diving Council |

### **Alternates and Other Participants**

|                  |                                     |
|------------------|-------------------------------------|
| Mr. Chris Luboff | Western Washington Toxics Coalition |
| Mr. Richard Rutz | Seattle Audubon Society             |

## EXECUTIVE SUMMARY

Previous studies of Elliott Bay and the lower Duwamish River have revealed extensive contamination of sediments by toxic metals such as copper, lead, zinc, and arsenic, as well as organic compounds such as petroleum products and polychlorinated biphenyls (PCBs). Some of these substances may pose hazards to the aquatic ecosystem. For example, toxic contamination may decrease the abundance and diversity of benthic invertebrate communities, increase the prevalence of tissue disorders such as liver tumors in fish, and result in the accumulation of chemicals in tissue of fish and shellfish.

The U.S. Environmental Protection Agency and the Washington Department of Ecology, working with the city of Seattle, the Municipality of Metropolitan Seattle, and others, developed the Urban Bay Action Program to reduce toxic contamination in urban bays including the Elliott Bay system. The Elliott Bay Action Program 1) identifies priority problem areas of toxic contamination, 2) identifies current, historical, and potential sources of toxic contaminants, 3) establishes schedules for corrective actions to eliminate existing problems and investigate potential problems, and 4) identifies appropriate agencies for implementing corrective actions.

Priority problem areas were identified by analyzing data on chemical contamination and biological effects (PTI and Tetra Tech 1988). Areas received a high ranking in terms of priority for action if they exhibited particularly high levels of chemical contamination or biological effects such as high prevalence of liver tumors among bottom-dwelling fish, or very low abundances of benthic invertebrate species. Actual and potential contaminant sources were identified for each priority problem area based in part on the similarity in contamination patterns between contaminant sources and offshore sediments (Tetra Tech 1988).

Corrective actions may include both source controls and sediment remedial actions (cleanup), such as capping or removal of contaminated sediment. Source controls may include permit revisions (or permitting of unpermitted discharges) to require reduction of contaminant concentrations or volume of discharges, and application of best management practices to reduce the contamination of surface runoff. Information on proposed corrective actions, implementation schedules, and responsible agencies is presented in this document.

The 1988 Action Plan represents the concerted efforts and commitments of many regulatory agencies and local government to reduce toxic contamination in the Elliott Bay system. Representatives of regulatory agencies and local government formed the Interagency Work Group, which has met on a regular basis since 1985 to formulate a course of action for control of contamination in Elliott Bay. Efforts of the Interagency Work Group were complemented by input from the Citizens Advisory Committee, composed of representatives from public and private organizations (e.g., environmental groups and businesses and industries from the area) and other interested individuals.

The 1988 Action Plan is being carried out by existing regulatory and resource management agencies, local governments, and a special Action Team for Elliott Bay. The members of the action team are funded by the Washington Department of Ecology with the support and participation of the Municipality of Metropolitan Seattle and the city of Seattle.

The regulatory and management efforts of the 1988 Action Plan focus on sources that are most directly related to priority problem areas. Most of the priority problem areas are located in the lower Duwamish River near and adjacent to Harbor Island. Others include the area offshore of the Denny Way combined sewer overflow and the Seattle waterfront near Madison Street.

The 1988 Action Plan is a working document designed to be refined as new data are made available. The Interagency Work Group will meet bimonthly to coordinate action plan implementation, review progress made on implementation, resolve any problems, and refine the plan to reflect new information.

## INTRODUCTION

In response to widespread concern over the environmental health of Puget Sound, several agencies with regulatory, resource management, and research responsibilities joined forces in 1985 to initiate the Puget Sound Estuary Program (PSEP). A primary objective of this program is to minimize toxic chemical contamination of the sound and protect its living resources, such as fish, shellfish, and wildlife. Inner harbors and waterways of Puget Sound, because of their poor flushing characteristics, are easily contaminated by toxic chemicals released into the sound or its drainage basin as a result of human activities. For example, localized areas of high contamination and associated biological effects have been found near discharges from industrial facilities, sewage treatment plants, and urban storm drains (SD).

As a primary element of PSEP, the Urban Bay Action Program focuses on identifying and reducing contaminant releases through a series of coordinated actions by government agencies and responsible private parties (e.g., industries and businesses). Pollution control activities may include improvement of drainage or treatment systems for stormwater and sewage, development of stricter permit conditions for wastewater dischargers, enforcement of hazardous materials regulations, and initiation of best management practices or cleanup measures at sites of concern.

The 1988 Action Plan for the Elliott Bay Action Program is described in this report. The corrective actions developed for specific sites within the Elliott Bay project area are organized by the priority problem areas identified in PTI and Tetra Tech (1988). For each priority problem area and associated contaminant source, the plan specifies the recommended corrective actions, the agencies responsible for implementing those actions, and approximate implementation schedules. The remainder of this introduction provides background information on the project area, a description of the Elliott Bay Action Program, and a summary of the technical approach used to evaluate priority problem areas and contaminant sources.

## OVERVIEW OF ELLIOTT BAY AND ITS TOXIC CONTAMINATION PROBLEMS

Elliott Bay, located on the eastern shore of central Puget Sound at Seattle, covers a 30-square-kilometer area with water depths up to approximately 180 meters (Figure 1). The Duwamish/Green River system, which flows into the southern portion of inner Elliott Bay, is the primary source of fresh water to the bay. The river channel is actually a salt-wedge estuary, influenced by tidal action over its lower 16 kilometers (including all of the riverine portions of the project area). Harbor Island divides the lower reaches of the Duwamish River into the East and West Waterways. The majority of the river flow enters the bay through the West Waterway. Natural resources of the bay include salmon, flounder, shrimp, squid, and clams. The Duwamish/Green River system supports commercial and recreational salmon and steelhead fisheries valued at \$10 million annually.

The project area includes Elliott Bay east of a line between Alki Point and West Point, the East and West Waterways, and the lower 10 kilometers of the Duwamish River upstream to the head of navigation (Figure 1). The drainage basin contains extensive industrial development and one of the largest container ports in the nation. Historical as well as recent industrial activities have centered largely on Harbor Island, the eastern shore of the inner bay, and areas along the lower Duwamish River.

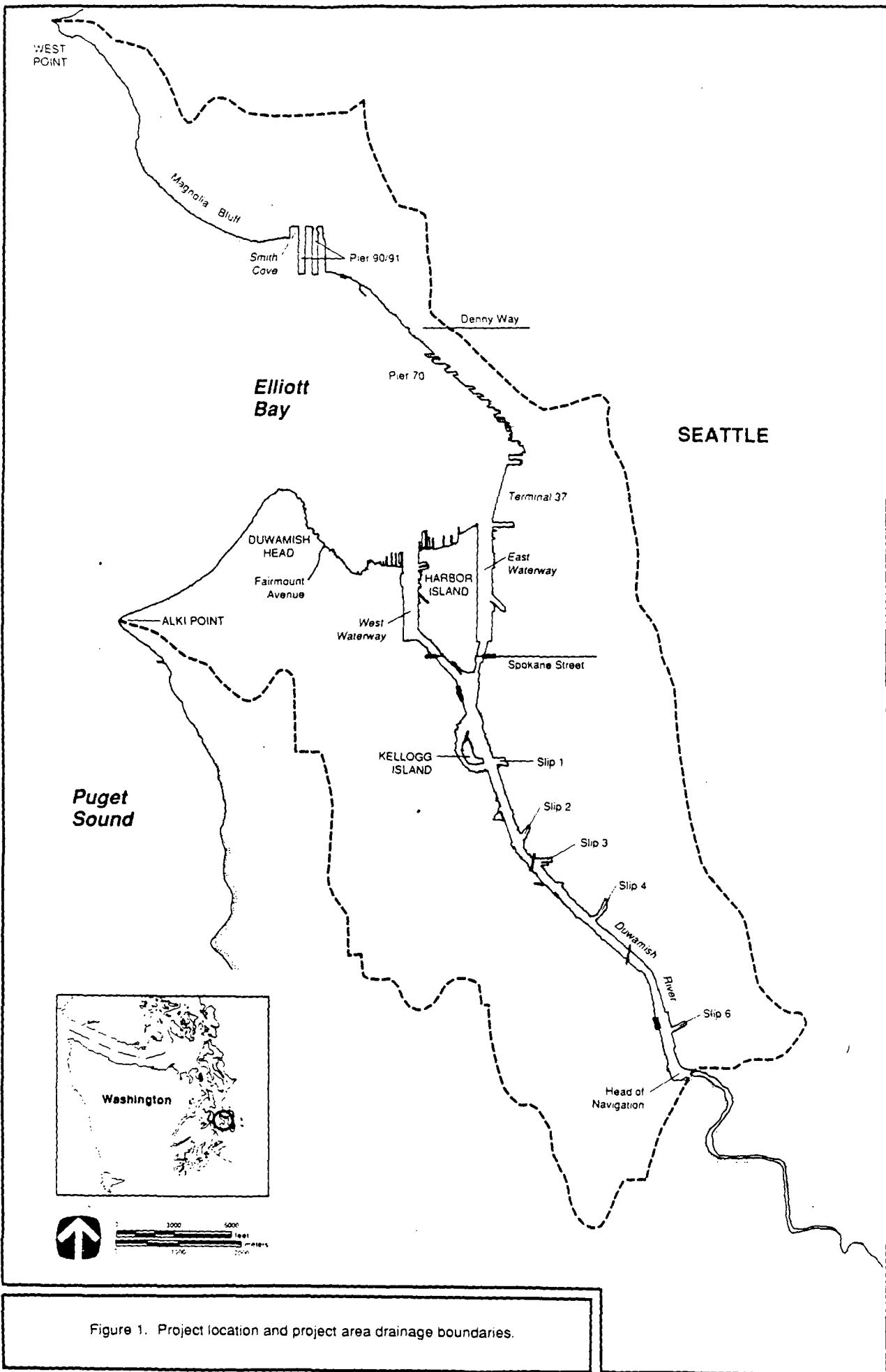


Figure 1. Project location and project area drainage boundaries.

As a result of urban and industrial influences, localized areas of nearshore Elliott Bay and the lower Duwamish River have been extensively contaminated by toxic chemicals. Investigations by the U.S. Environmental Protection Agency (EPA), the Municipality of Metropolitan Seattle (Metro), and the National Oceanic and Atmospheric Administration (NOAA) during the 1970s revealed high concentrations of toxic chemicals in sediments on the bottom of the bay and river. Inputs from discrete pollutant sources have resulted in a patchwork of toxic sediments that include some of the most contaminated areas in Puget Sound. The contaminants include potential carcinogens, such as polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAH), and toxic metals, such as arsenic and lead. Cancerous liver tumors were found in up to 16 percent of the English sole (a bottom-dwelling fish) caught in contaminated areas of the bay and river, whereas these lesions are usually absent in fish caught in relatively uncontaminated areas of the sound. In addition, populations of invertebrate animals living in the bottom sediments were severely reduced in highly contaminated areas.

### ELLIOTT BAY ACTION PROGRAM

In January 1985, PSEP member agencies initiated the Elliott Bay Action Program. This program was built partly on the past and continuing environmental programs of the Washington Department of Ecology (Ecology), Metro, the Port of Seattle, and others. In particular, the Duwamish Clean Water Plan (Metro 1983) and the Duwamish Nonpoint Source Investigation (Metro 1985) identified the high priority environmental problems and recommended solutions for the severely polluted portions of the Duwamish River.

Through a process of interagency coordination, local government support, and public participation, the Elliott Bay Action Program has focused new and continuing pollution control efforts on the priority problem areas within the bay and river. The objectives of the Elliott Bay Action Program are:

- Identify specific toxic areas of concern in the bay and river based on chemical contamination and associated adverse biological effects
- Identify historical and ongoing sources of contamination
- Rank toxic problem areas and sources (to the extent possible) in terms of priority for development of corrective actions
- Implement corrective actions to reduce or eliminate sources of ongoing pollution and restore polluted areas to support natural resources and beneficial uses.

The Elliott Bay Action Program has followed a process in which corrective actions are developed and implemented in phases to take advantage of new scientific data and emerging ideas about practical solutions to toxic contamination problems (Figure 2). First, existing data on sediment contamination and biological effects were analyzed, and priority problem areas were identified [Tetra Tech (1986); the draft report was available in 1985]. Next, an Interim Action Plan (Tetra Tech 1985b) was developed for immediate control of known pollutant sources where adequate information was available. Finally, data gaps were filled by further sampling and analysis, and the 1988 Action Plan was developed to update priorities for corrective actions. The 1988 Action Plan will be revised in the future as new data become available to refine the definition of environmental problem areas and contaminant sources.



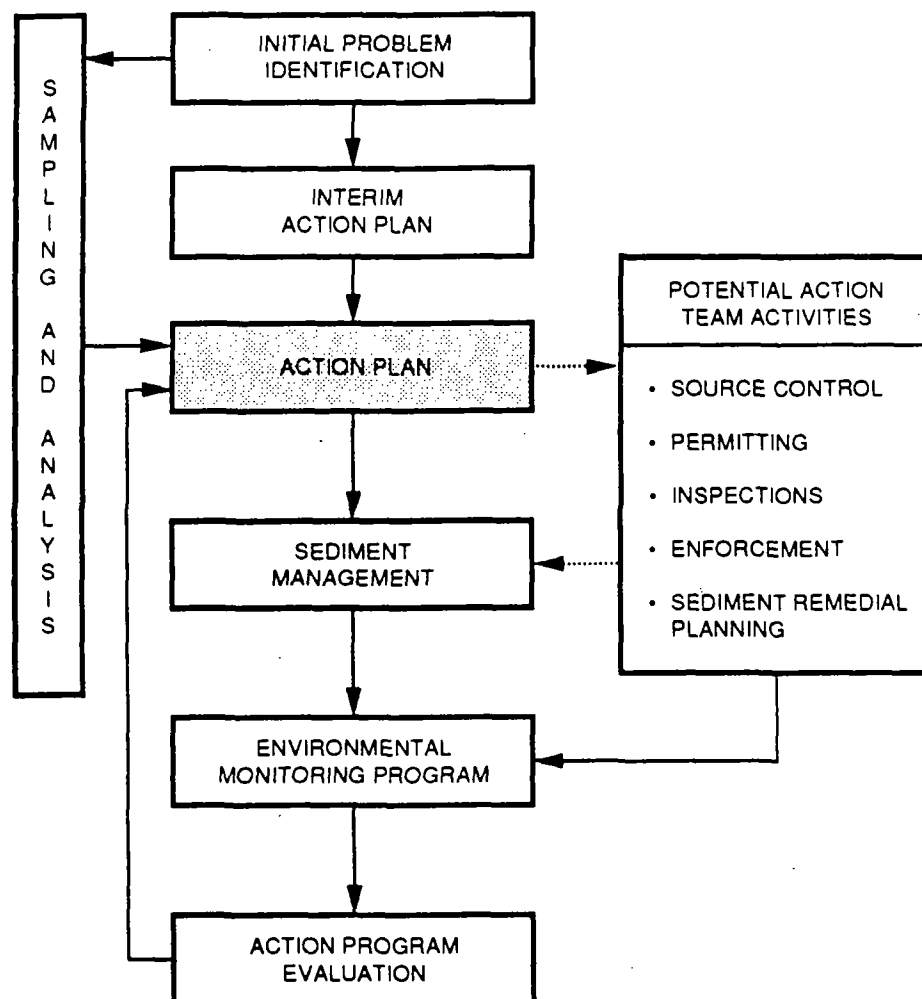


Figure 2. Elements of the Elliott Bay Action Program.

Corrective actions primarily involve source controls to reduce or eliminate inputs of toxic contaminants, but they may also include alternatives for cleaning up contaminated sediment and environmental monitoring to evaluate program success. Sediment cleanup (i.e., remedial) actions and environmental monitoring are potentially long-term components of the Elliott Bay Action Program. Examples of sediment remedial activities include capping contaminated sediments with clean materials and removing the contaminated sediments by dredging.

Ideally, source controls should be implemented before remedial actions are taken on sediments to avoid recontamination of an area that has been cleaned up. Moreover, sediment remediation is an expensive and complex process that requires considerable site-specific data and review of environmental effects during the planning process. To determine the best course of action, regulatory and resource management agencies must evaluate the environmental benefits and risks of alternative sediment remedial actions relative to costs. Monitoring is conducted to evaluate the effectiveness of source control and sediment remediation (Figure 2).

Early in 1985, the Interagency Work Group (IAWG) and the Citizens Advisory Committee (CAC) were formed to contribute to the technical development of the program and create the interim and final action plans. The IAWG is composed of representatives from federal, state, and local agencies. The CAC is composed of representatives from environmental and other interest groups and area business and industry organizations (see Acknowledgments section for full membership list of the IAWG and CAC).

### **Implementation of Action Plans**

The 1988 Action Plan serves as a blueprint for field investigations, permit review, site cleanup, and other activities intended to control specific pollutant sources. A field task force, the Elliott Bay Action Team (EBAT), was created in September 1985 for conducting site inspections, identifying pollutant sources, revising discharge permits, and initiating regulatory responses. The task force includes four staff members from Ecology and one staff member from Metro. EBAT builds on earlier efforts of Metro and Ecology (e.g., Metro 1983, 1985) and encourages private industries and other responsible parties to take the initiative in reducing or eliminating pollutant discharges.

Regulatory authority for EBAT stems primarily from Ecology, which is responsible for permitting and site inspections under state water pollution control laws and regulations, the federal Clean Water Act, and hazardous substance control programs. Ecology has regulatory authority over storm drains that discharge to state waters. Metro owns and operates lift stations, pump stations, regulators, and sewage treatment plants. In addition, Metro is responsible for issuing and enforcing permits for discharges from industrial or commercial facilities to the sanitary sewer system. The city of Seattle owns and maintains storm drain and sewer collection systems. However, some storm drains are privately owned, including many on waterfront property. Under various environmental regulations, other agencies (e.g., the Port of Seattle) and private industries are responsible for pollution prevention and abatement related to their property and activities.

### **Past Accomplishments**

Early successes of the Elliott Bay Action Program included the identification of 42 unpermitted discharges and 15 contaminated upland sites requiring cleanup, development of permits incorporating best management practices for shipyards, cleanup of two

upland sites, and negotiations for cleanup of 12 additional sites (Ryan 1987). Between September 1985 and September 1987, EBAT conducted more than 175 inspections at 102 sites in the Elliott Bay project area. These activities resulted in:

- Termination of several direct discharges of industrial wastewater or reuse of wastewater
- Rerouting of several industrial discharges to the sanitary sewer system
- Modification of existing discharge permits or development of new permits
- Initiation of enforcement actions due to noncompliance.

As of September 1987, enforcement actions initiated by EBAT include 36 notices of violation, 22 administrative orders, and 28 fines totaling \$44,200.

## **TECHNICAL APPROACH**

During late 1985, EPA conducted field surveys to collect data in support of the Elliott Bay Action Program. The field surveys were designed to provide an assessment of environmental contamination and effects (PTI and Tetra Tech 1988) and an initial evaluation of potential contaminant sources (Tetra Tech 1988). The approach used to identify and rank problem areas in terms of priority for evaluation of potential contaminant sources and remedial action is described in the next section. The approach used to evaluate potential contaminant sources is described in a following section.

### **Identification and Ranking of Problem Areas**

Following are listed the five types of environmental indicators used to identify and rank problem areas (also see Figure 3):

- **Sediment Chemistry**
  - Contaminant concentrations
  - Apparent effects thresholds (AET), which are chemical concentrations in sediments above which a particular adverse biological effect is expected to be statistically significant ( $P < 0.05$ ) relative to appropriate reference conditions
- **Bioaccumulation**
  - Pesticide, PCB, and mercury concentrations in muscle tissue of English sole
- **Sediment Bioassays**
  - Amphipod mortality (10-day bioassay)
  - Oyster larvae abnormality
- **Benthic Infauna Abundances**
  - Polychaete abundance
  - Crustacean abundance

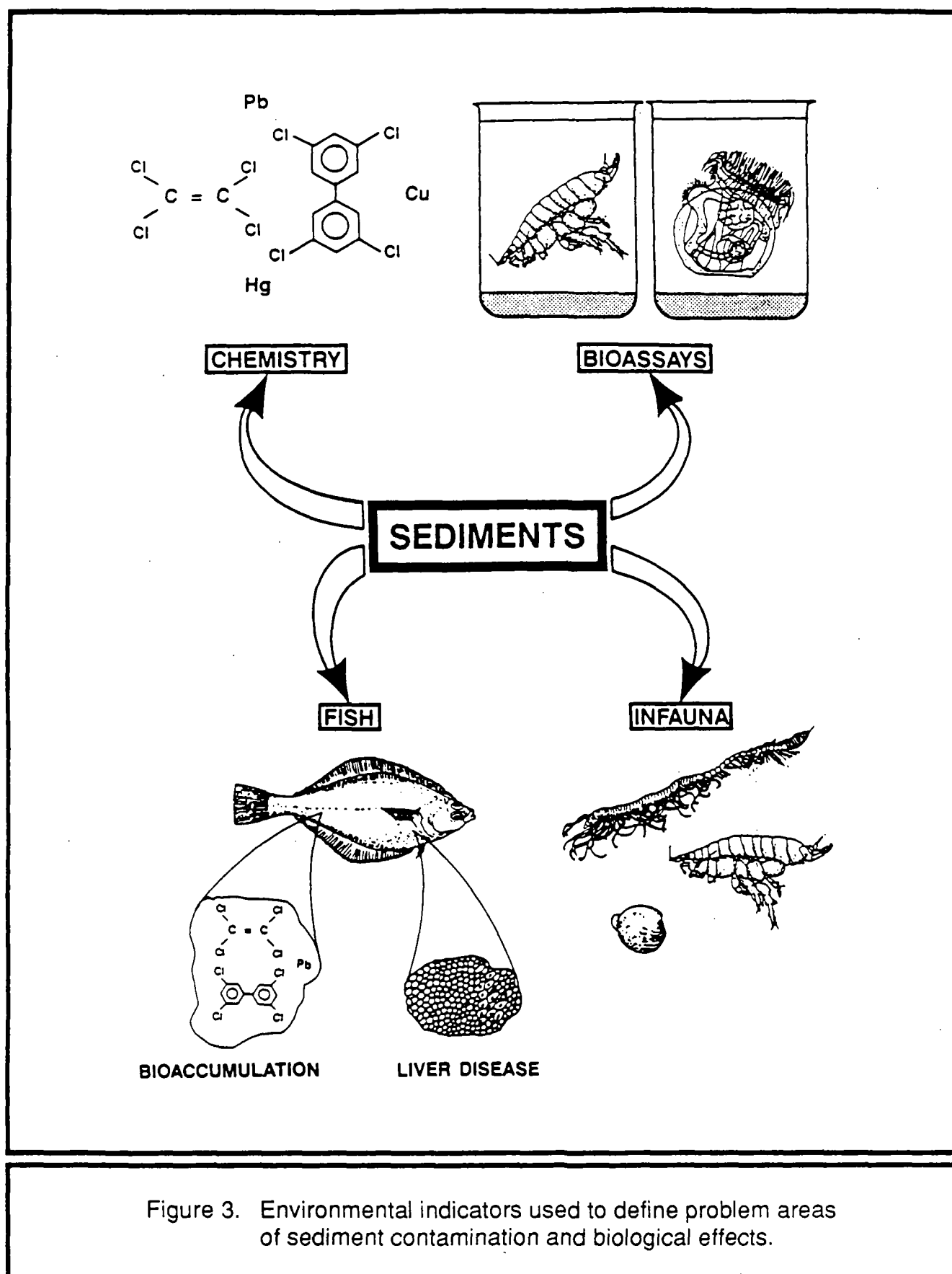


Figure 3. Environmental indicators used to define problem areas of sediment contamination and biological effects.

- Pelecypod abundance
- Gastropod abundance
- **Fish Pathology**
  - Lesion (e.g., tumor) prevalence in livers of English sole.

The rationale for using the five kinds of environmental indicators is provided in Tetra Tech (1985a, 1986). Puget Sound AET were used as sediment quality values to evaluate chemical data relative to predicted biological effects. Because AET are predictive, they were especially useful in interpreting historical data on sediment contaminant levels. Although many other variables were evaluated throughout the decision-making process, those shown above formed the basis for problem identification and priority ranking.

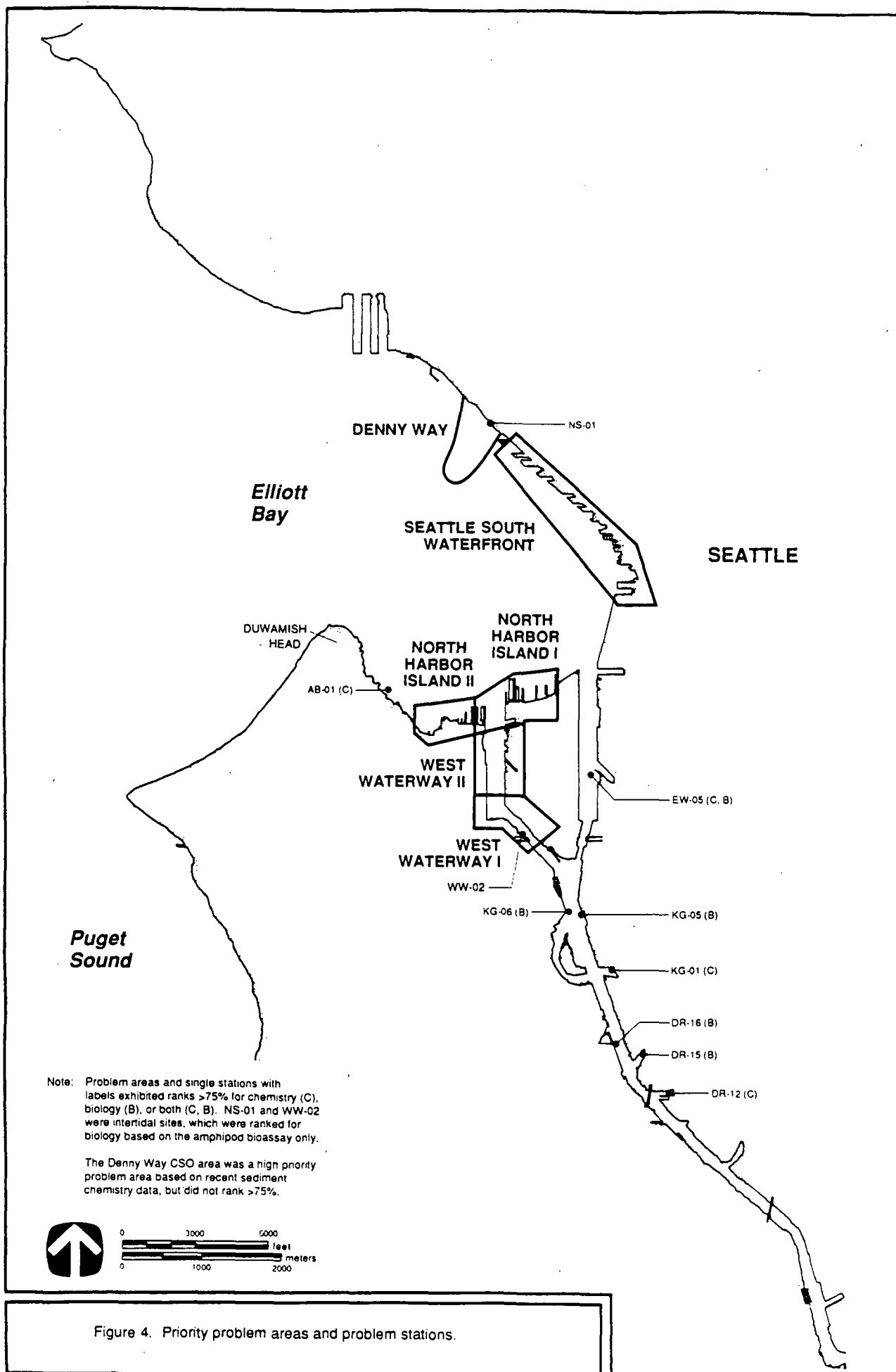
The preponderance-of-evidence approach was used to identify and rank problem areas. Identification of the worst problem areas, based on multiple indicators of chemical contamination and biological effects, facilitates the efficient use of resources for pollutant source investigations and remedial actions. Project areas that exhibited high values for multiple indicators of contamination and adverse effects received the highest priority ranking. Priority problem areas and problem stations are illustrated in Figure 4.

#### **Identification of Potential Contaminant Sources**

Potential sources of contamination in the lower Duwamish River and Elliott Bay include municipal wastewater treatment plants, combined sewer overflows (CSOs), surface runoff, contaminated groundwater, industrial discharges, atmospheric deposition, and accidental spills. Actual and potential contaminant sources in the Elliott Bay project area were identified in the Interim Action Plan (Tetra Tech 1985b) based on 1) existing information about past and present activities, and 2) information from site inspections and discharge permits. Data were available from Ecology files for facilities with permitted or known nonpermitted discharges, facilities contributing to contamination due to poor housekeeping practices, and sites with groundwater or soils contamination. Several major CSOs and storm drains were also identified as contaminant sources.

Previous source control efforts of EPA, Ecology, Metro, and the city of Seattle have eliminated most known direct industrial discharges to the bay and river by routing them to municipal wastewater treatment plants. In addition, effluent from Metro's Renton municipal wastewater treatment plant was diverted from the Duwamish River to Puget Sound (off Duwamish Head) in early 1987. Ongoing contaminant sources include contaminated groundwater, storm drains, CSOs, and probably unidentified direct discharges. CSOs and storm drains are probably the most significant ongoing contaminant sources in the project area because they collect and discharge stormwater runoff, thereby transporting contaminants from most of the nonpoint sources in the project area. In addition, during wet-weather, high-flow conditions, CSOs discharge municipal sewage from the Metro system that may contain industrial effluent. However, there are most likely still unknown direct discharges that need to be identified, characterized, and abated.

To better characterize contaminant inputs from CSOs and storm drains, EPA conducted a screening-level survey in 1985 (Tetra Tech 1988). During this effort, sediment was collected from the downstream end of 7 CSOs, 20 storm drains, and 15 combination CSO/storm drains that discharge directly into the waters of the project area. Sediments from the drains were analyzed for the same contaminants measured in



offshore sediments. These drains and other potential sources were evaluated for their contribution of contaminants to priority problem areas and problem stations identified in Figure 4. Tetra Tech (1988) evaluated various potential sources based on the following elements:

- Proximity of the potential source to the problem station offshore
- Similarity of the kinds of problem chemicals in sediments of drains and the receiving environment
- Similarity of the relative percent distribution of chemicals within the drain and in the receiving environment (i.e., percentage composition for a particular contaminant within a group of related contaminants [e.g., low molecular weight polycyclic aromatic hydrocarbons (LPAH), high molecular weight polycyclic aromatic hydrocarbons (HPAH), and metals])
- The spatial distribution of contaminants in offshore sediments
- Available information on past and ongoing practices that may contribute to observed contamination.

Ten priority drainages were identified for source control activities based on information developed or compiled during the problem area analysis (PTI and Tetra Tech 1988) and the evaluation of potential contaminant sources (Tetra Tech 1988). CSOs and storm drains were evaluated based on:

- The number of problem chemicals identified in sediments of each drain
- The magnitude of exceedance of sediment chemistry conditions in reference areas [i.e., elevation above reference (EAR)]
- A contaminant loading index.

The number of problem chemicals identified in sediments of each drain is indicative of the variety of sources responsible for contamination in the drain sediments. The magnitude of the elevation above reference (EAR) was calculated from the sum of the EAR for the individual problem chemicals identified in each drain. The sum of individual EAR is an indication of the severity of the contamination problem in each drain. Loading indices take into account both the measured concentrations of contaminants in the drain sediments and estimated annual discharges from each drain (based on drainage basin area, land use characteristics, and average annual runoff). Although loading indices do not directly correspond to actual contaminant loading, they provide an indication of the potential magnitude of effects on the receiving environment.

Figure 5 shows the locations of CSOs and storm drains that are potential sources of contaminants to priority problem areas and problem stations, as well as other CSOs and storm drains that have been identified as potential contaminant sources. Appendix A provides a summary of the source evaluation for each problem area and problem station as presented by Tetra Tech (1988).

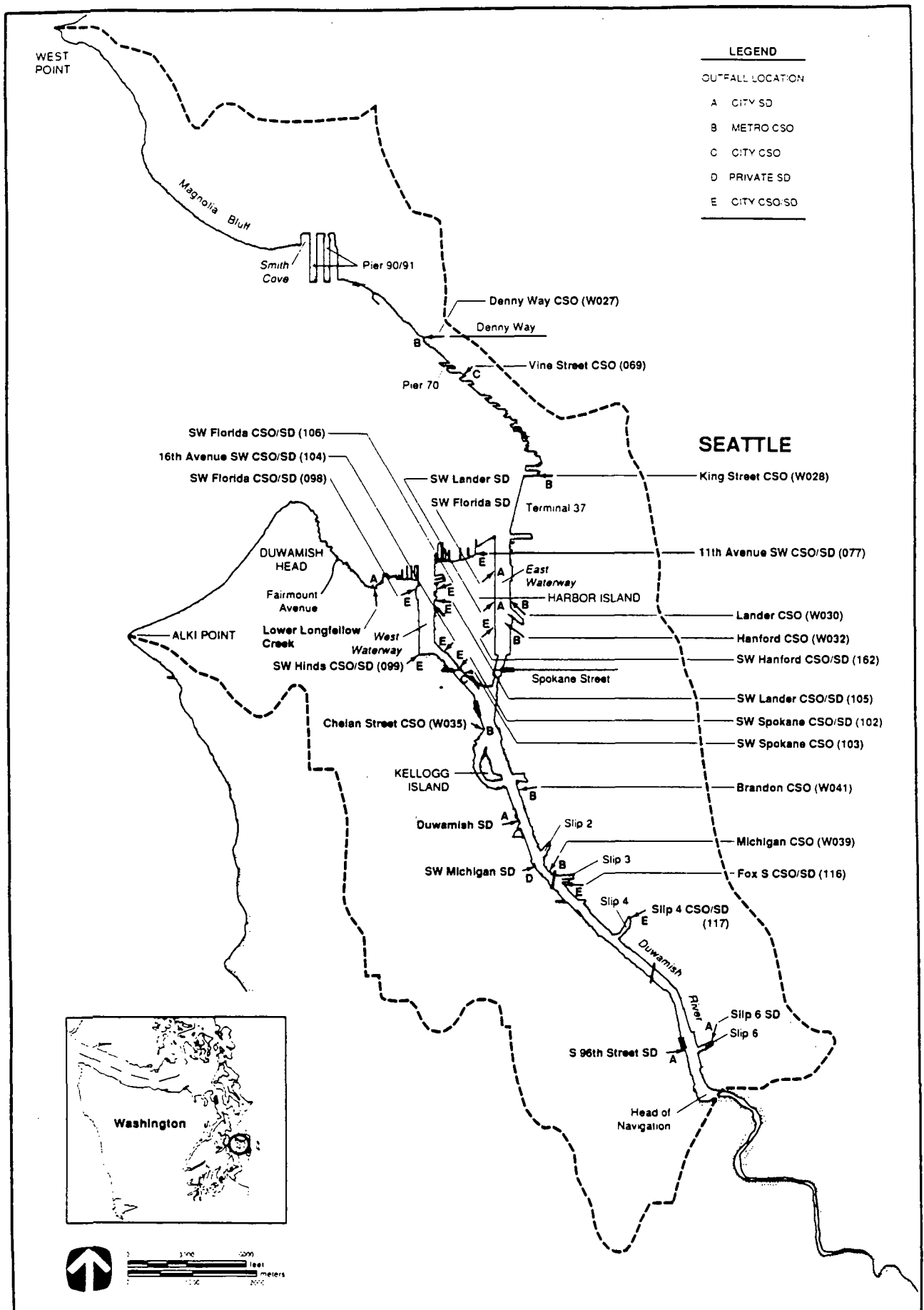


Figure 5. Locations of priority CSO and storm drain contaminant sources in the Elliott Bay project area.



## 1988 ACTION PLAN FOR ELLIOTT BAY

Many planned or ongoing actions to control contaminant inputs to the project area are part of comprehensive programs or planning activities of federal, state, and local government agencies. The first part of this section describes these programs. The second part of this section presents a detailed action plan for controlling contaminant discharges to priority problem areas.

### COMPREHENSIVE PROGRAMS AND PLANS

The following programs and plans are described in terms of actions that can be taken to identify or control ongoing sources of contamination to the project area. Programs and plans are discussed according to major implementing agency or local government body.

#### U.S. Environmental Protection Agency - Superfund

In addition to the Urban Bay Action Program, EPA programs under the federal Comprehensive Environmental Response, Compensation, and Liability Act (Superfund, as amended) may result in activities to solve toxic contamination problems in the project area. Under Superfund, EPA, Ecology, responsible parties, or potentially responsible parties investigate the extent of contamination in environmental media, assess chemical risks to human health and the environment, and design and implement cleanup actions to reduce or eliminate risks at hazardous waste sites of national priority. EPA's Superfund program is important to the Elliott Bay project area primarily because Harbor Island, including its active and inactive facilities, is designated as a national Superfund site.

As part of EPA's Superfund program, contaminated sites on Harbor Island and potential sources of contaminants to the East and West Waterways and Elliott Bay (including CSOs and storm drains) are to be investigated. In general, the Superfund process begins with a remedial investigation (RI) and feasibility study to characterize site contamination and evaluate cleanup alternatives. A work plan for Phase I of the Harbor Island RI has been developed by EPA and Ecology. The objectives of the Phase I RI are to characterize soil contamination, examine pathways for contaminant migration (including groundwater and storm drains), and determine the needs for source control, further study, and remedial measures.

There are five parts to the RI:

- **Part 1 - Secondary Lead Smelter/Seafab Metals.** There is known contamination in soils and groundwater on this property. Current activity consists of enforcement of an administrative order issued by EPA on 10 October 1987 under Section 3013 of the Resource Conservation and Recovery Act (RCRA). The administrative order requires the current property owner to conduct soil and groundwater sampling. It is expected that Seafab Metals will submit a work plan to EPA in September 1988 and commence sampling in October 1988.

- **Part 2 - Groundwater.** The extent of groundwater contamination at the Harbor Island site is unknown. Groundwater may be a significant pathway for contaminant migration to the lower Duwamish River and Elliott Bay. Phase I investigations are designed to characterize groundwater dynamics and contamination, including potential contaminant transport. Twenty monitoring wells will be located throughout the site, and work is scheduled to begin in October 1988.
- **Part 3 - Soil Sampling.** Six areas of hazardous materials release and potential soils contamination will be investigated during the Phase I RI: Non-Ferrous Metals, Seattle Iron and Metals (two sites), Pacific Molasses, Port of Seattle (two sites), Union Pacific Railroad (two sites), and Value Metal Plating.
- **Part 4 - Petroleum Storage Facilities.** Data review and investigations will be conducted as necessary at facilities with documented or suspected histories of spills and other releases.
- **Part 5 - Storm Drains.** Previous sampling of storm drain sediment [including sampling reported by Tetra Tech (1988)] has indicated that storm drains may be a significant pathway of contaminant transport to the lower Duwamish River and Elliott Bay. There are approximately 10 city-owned and 60 privately-owned storm drains on Harbor Island. EPA has notified the city of Seattle of its responsibility to sample and analyze storm drain sediments. EPA and the city of Seattle are negotiating a work plan for sampling city-owned storm drains. This plan should be completed in October 1988 and implemented shortly thereafter.

Planning for Phase II of the RI is expected to begin in June-July 1989. Phase II RI investigations are expected to begin in October 1989. The scope of the Phase II RI will be based in part on Phase I results (e.g., city of Seattle storm drain sampling) and results of other investigations (in particular, results of the Elliott Bay Action Program studies).

#### **Washington Department of Ecology**

In addition to the Elliott Bay Action Program, Ecology has a number of ongoing programs and planning activities related to toxic contamination in the Elliott Bay project area. Programs that are most directly related to control of toxic contaminants are described below.

**National Pollutant Discharge Elimination System (NPDES)**--Permits are generally issued on a site-by-site basis and can include more than one discharge or source of pollutants. Permits for municipal wastewater treatment plants authorize discharges throughout the plant's service area, including CSOs. Industrial permits may include a storm drain component (for surface runoff) as well as wastewater discharges. NPDES permits may require effluent limitations (concentration or total loading) for toxic contaminants and may include provisions for instituting best management practices to reduce nonpoint contaminant inputs. New NPDES regulations require property owners and tenants in certain land use categories to submit data regarding surface water runoff.

Ecology maintains 41 NPDES discharge permits in the Elliott Bay project area. Most of the industrial discharges consist of noncontact cooling water or stormwater. There are currently no permitted discharges of process wastewater to waterways of the project area.

**Resource Conservation and Recovery Act--**The joint EPA/Ecology RCRA program governs the generation, handling, and disposal of hazardous wastes. Spill prevention and containment measures, material handling requirements, groundwater monitoring, and site cleanup can be required as part of a RCRA permit.

**Sediment Standards Development--**Ecology has been a lead agency or key participant in several efforts to develop tools for evaluating and managing contaminated sediments [e.g., Commencement Bay Superfund project, Puget Sound Dredged Disposal Analysis (PSDDA), Urban Bay Action Program, and Puget Sound Water Quality Management Plan]. Ecology is currently developing sediment quality standards, effluent particulate limits, criteria for confined disposal of dredged material, and remedial action (cleanup) standards. In addition, guidelines for unconfined disposal of dredged material are being developed under PSDDA, as discussed below.

#### **Municipality of Metropolitan Seattle**

Metro is responsible for the collection (responsibility shared with the city of Seattle), treatment, and disposal of municipal wastewater in the Elliott Bay project area. Metro continues to play a key role in supporting EBAT, dedicating one full-time employee to EBAT and providing laboratory support for the analysis of 30 field samples for metals and 12 samples for organic contaminants on a yearly basis. Metro has five other programs or planning activities underway that are directly relevant to the Elliott Bay Action Program. The Lander Street Sewer Separation Project, the Key Manhole Program, and the Small Quantity Hazardous Waste Generator Program are directed by Metro's Industrial Waste Section. In June 1988, Metro released its final CSO control plan, which is designed to meet Ecology's requirement for a 75 percent CSO volume reduction in the Metro service area by the year 2008. These programs and planning activities are described below.

**Lander Street Sewer Separation, Industrial Inventory, and Source Control Project--**The Lander Street Sewer Separation Project is a component of Metro's overall CSO control plan. It is discussed separately here because of its timeliness and importance to the Elliott Bay project area. The Lander Street sewer basin covers the area from the East Waterway between Holgate Street and Hanford Street east to Interstate 5. The Lander Street Sewer Separation Project involves the partial separation of sanitary flows from storm flows in the Lander Street sewer basin. Land use in the Lander Street basin is predominantly industrial, and the separation project will double the volume of stormwater discharged to the East Waterway.

The overall loading of pollutants to the Duwamish River could increase if separation is implemented without any source control efforts. Therefore, Metro is concurrently pursuing an aggressive stormwater mitigation program. The goals of this project are to:

- Identify industrial and commercial sources of pollutants
- Increase the awareness of business owners, managers, and workers concerning the fate of pollutants they discharge to storm drains and sanitary sewers
- Reduce pollutant loading to the storm and sanitary sewers by resolving pollution problems on a site-by-site basis
- Educate small-quantity hazardous waste generators regarding disposal options.

The project began on 1 June 1988 and is scheduled for completion on 31 May 1989.

**Key Manhole Program--**The key manhole program entails tracing and identifying contaminant sources in distribution systems (e.g., sewer trunk lines and interceptors) within the Metro service area. The first phase of the program, which began in 1985, consisted of comprehensive characterization of the waste stream. This phase began with two 2-week intensive sampling events per year, one each at the West Point and Renton municipal wastewater treatment plants. This sampling was augmented in 1986 by 14 grab samples per month taken from locations in the service areas of the West Point and Renton treatment plants.

The second phase, which consists of source identification and pollutant reduction (with an emphasis on cadmium), began in 1988. The second phase focuses on priority basins to be selected by the following criteria:

- The nature of NPDES discharges within the basin
- Results of previous source tracing studies
- Identified need for separation projects within the basin
- The number and magnitude of CSOs in the basin
- Discharges from the basin to a water body of concern (e.g., Duwamish River, Elliott Bay, or Lake Union).

Sewage at key junctures (manholes) within a distribution system are sampled and analyzed to trace sources of contaminants within the sewage collection system. Identification of contaminant sources is aimed at decreasing the amounts of cadmium and other pollutants in treatment plant sludge, decreasing the chance of NPDES violations, and improving the identification of potential sources of spills from industrial facilities. Staff additions in 1989 will allow the program to intensify focused sampling efforts and engage in outreach activities within the commercial and industrial community to reduce contaminant loads to the Metro system.

**Small Quantity Hazardous Waste Generator Program--**Metro is developing a hazardous waste generator information and assistance program in an effort to reduce the input of pollutants from small dischargers. The program is being implemented in King, Snohomish, Pierce, and Kitsap counties. The first phase of the program is the development of a model education/assistance program for three target groups of small-quantity hazardous

waste generators: 1) automotive repair and body shops, 2) marine repair facilities and boatyards, and 3) photo-processing, printing, and graphic arts businesses. The program emphasizes the measures each type of business can take to protect Puget Sound and at the same time minimize or eliminate liabilities and disposal costs by reducing the amount of hazardous waste produced. This first phase, funded by the Puget Sound Water Quality Authority (PSWQA), will be a cooperative effort between Metro's Industrial Waste Section, the Independent Business Association, and the Small Quantity Generator Committee.

**Combined Sewer Overflow Control Plan--**Metro's Final Combined Sewer Overflow Control Plan presents several CSO reduction strategies to achieve a 75 percent reduction in CSO volume overall in the Metro service area over the next 20 years. Metro's CSO control plan incorporates actions proposed by the city of Seattle for CSO control (e.g., stormwater separation). Actions proposed by Metro's plan that are most relevant to the Elliott Bay project area are:

- Modifications to the Computer Augmented Treatment and Disposal (CATAD) system to control flows and locations of CSOs, in part by maximizing in-line storage
- Sewer/storm drain separation in the Hanford and Lander systems and development of the Bayview tunnel for enhanced storage
- Sewer/storm drain separation in the Diagonal Way system
- Sewer/storm drain separation in the Kingdome/industrial area
- Sewer/storm drain separation in the Michigan Street system
- Sewer/storm drain separation in the Denny Way system (CWC-HDR 1988).

**Sediment Remediation Efforts--**Metro's Marine Assessment Group is involved in a project that focuses on the elimination of chemical hot spots in Elliott Bay. As part of this project, Metro has developed plans for sediment capping in the vicinity of the Denny Way CSO outlet (Sample, T., 9 September 1988, personal communication; Romberg and Sumeri 1988). The first phase of the project, scheduled to be completed in the summer of 1989, involves removing contaminated sediments from two sewer lines that are tributary to the Denny Way CSO. The second phase, scheduled to be completed in March 1990, consists of capping contaminated sediments in Elliott Bay with clean material (Sample, T., 9 September 1988, personal communication). Previous source identification and source control efforts by Metro and the city of Seattle have significantly reduced contaminant inputs to the Denny Way CSO system (Romberg et al. 1987).

In addition to the Denny Way CSO effort, Metro has sampled several sediment grids along the Seattle south waterfront to better define the impacted areas and evaluate priorities for remedial action.

#### **City of Seattle**

The most important programs of the city of Seattle, in terms of reducing contaminant input to the Elliott Bay project area, are described below. In addition to these programs,

the city of Seattle is revising its grading and drainage code, side sewer ordinance, and building code to allow greater regulation of stormwater and to enhance flood control requirements. The city is also increasing maintenance of drainage systems, including cleaning of ditches, catchbasins, and storm drains.

**Combined Sewer Overflow Control Plan**--Since 1968, the city of Seattle has conducted a major program involving sewer separation and construction of storage tanks. Under this program, 50 of 80 CSOs associated with city collection systems will be controlled by 1989. In response to requirements imposed by Ecology, the city has developed a plan to achieve a 79 percent reduction in volume of the remaining 30 CSOs in its systems over the next 20 years. The city's CSO control plan targets the following systems in the Elliott Bay project area:

- Hanford tunnel sewer/stormwater separation
- Alaskan Way sewer/stormwater separation
- West Waterway, SW Hinds sewer/stormwater separation
- Interbay CSO, Pier 91 enhanced storage
- Vine Street CSO inlet modification to reduce CSO frequency and intensity
- Partial separation and inlet modification of waterfront CSOs
- Diagonal Way CSO complete separation and storage enhancement (Brown and Caldwell 1988).

**Longfellow Creek Monitoring**--The city of Seattle is currently conducting a water quality characterization study of stormwater flows to lower Longfellow Creek (Longfellow Slough). This pilot project will serve as a model for projects in other creeks in the city.

**Comprehensive Drainage Plan**--The Seattle Drainage and Wastewater Utility recently completed a study to provide the city with a coordinated plan for managing the existing urban drainage system (Kramer, Chin & Mayo 1988). The plan includes elements for capital improvements, ongoing maintenance, and monitoring. The plan also identifies alternative solutions to controlling flooding and pollution, such as regulatory controls and public education. The Comprehensive Drainage Plan calls for a number of actions in two drainage basins that discharge to the Elliott Bay/Duwamish study area, Delridge basin (i.e., upper Longfellow Creek) and South Park basin (Duwamish River upstream of W. Marginal Way). Recommended improvements for the Delridge basin include installation of a detention facility in the West Seattle golf course ravine and numerous channel enhancements and bypass pipelines. Recommended improvements for South Park include three detention facilities, a low-pressure drainage pipeline, and a new drainage collection network.

## **King County**

The King County program that is most relevant to the Elliott Bay Action Program is watershed planning directed by the Resource Planning Department.

In 1987 the Green/Duwamish River watershed was selected by Ecology as an early action watershed in its nonpoint source control program. Because of the large size and complexity of the Green/Duwamish watershed (i.e., large population base, many land uses, and many jurisdictions), the planning effort has focused on identifying ongoing nonpoint source pollution programs and enhancing interagency coordination. Since its inception, the program has identified five subbasins (watersheds) within the Green/Duwamish system. By the end of 1988, these subbasins will be ranked by the county watershed committee along with 17 other watersheds in King County. Action plans will be developed for priority watersheds and will address nonpoint pollution from animal keeping/pasture management, onsite septic systems, stormwater, and other significant sources.

### **Puget Sound Water Quality Authority**

PSWQA is a state agency charged with developing a comprehensive plan for water quality protection in Puget Sound for implementation by existing state and local governments. The draft 1989 Puget Sound Water Quality Management Plan (PSWQA 1988), released in June 1988, builds on elements and goals set out in the 1987 Puget Sound plan (PSWQA 1987). The draft 1989 plan delineates criteria, guidelines, potential sources of funding, management strategies, budgets, and schedules for 10 programs related to:

- Nonpoint source pollution control
- Shellfish protection
- Municipal and industrial discharges
- Contaminated sediments and dredging
- Stormwater and combined sewer overflows
- Laboratory support
- Wetlands protection
- Oil spill prevention and response planning
- Household hazardous waste
- Legal and personnel support.

In addition, the draft plan identifies three new initiatives (monitoring, research, and education and public involvement) and a 14-item unfinished agenda. Several programs have resulted in the adoption of new state regulations and the formation of state and local programs that are important to the Elliott Bay Action Program (e.g., watershed planning). Two of the most important aspects of the plan in terms of the Elliott Bay Action Program are the requirements for Ecology to develop and adopt sediment quality standards (see discussion above) and to enhance the control of contaminant discharges from permitted facilities.

## **U.S. Army Corps of Engineers - Puget Sound Dredged Disposal Analysis**

The U.S. Army Corps of Engineers (COE) is one of the principal agencies in Puget Sound responsible for regulating dredging and disposal of dredged material (including contaminated sediments). The COE is leading PSDDA in cooperation with the Washington Department of Natural Resources, EPA, and Ecology. The primary objectives of PSDDA are to:

- Identify acceptable sites for the open-water unconfined disposal of dredged material
- Define dredged material evaluation procedures for sediments that are being considered for disposal at PSDDA sites
- Formulate management plans for disposal sites.

Phase I of the PSDDA program, scheduled to be completed in the fall of 1988, has focused on central Puget Sound including Elliott Bay. Phase II, dealing with the remainder of Puget Sound, is expected to be completed by June 1989.

## **Seattle-King County Department of Public Health**

The Seattle-King County Department of Public Health has three ongoing programs that may result in decreases of toxic contaminant inputs to the Elliott Bay project area:

- **Local Hazardous Waste Plan.** In conjunction with Metro, the city of Seattle, and the King County Solid Waste Utility, the Seattle-King County Department of Public Health is developing a Local Hazardous Waste Plan. The plan is to be reviewed by Ecology and the appropriate governmental councils in June 1989 and will be implemented after approval. The main emphasis of the plan is the education of small-quantity generators of hazardous waste and household generators regarding the state's hazardous waste management priorities. The Seattle-King County Department of Public Health is conducting audits of individual businesses with histories of improper waste disposal practices (e.g., dry-cleaning establishments, pest-control operators, and auto-body shops). The program is oriented toward education and voluntary participation. The program currently contains no enforcement component.
- **Hazards Line.** The Seattle-King County Department of Public Health provides the Hazards Line as a service to households and businesses in the King County area. The Hazards Line provides information on proper waste disposal methods, recycling opportunities, and alternative nontoxic products. The Hazards Line receives approximately 45 calls per day.
- **Guide to Small Businesses.** The Seattle-King County Department of Public Health provides, on request, a pamphlet entitled *Hazardous Waste Disposal: Guide to Businesses*. This guide provides information on regulations governing small-quantity generators of hazardous waste, proper recycling and disposal methods, and other information.



## Port of Seattle

The Port of Seattle has several ongoing programs as well as future plans that will assist in identifying and controlling sources of contamination in the Elliott Bay project area. These programs are:

- **Dredging.** Dredging at port properties for both construction and maintenance of berth depth is an ongoing activity of the port. Dredging results in the removal and confined disposal of some contaminated sediment. In addition to removal of contaminated sediment by dredging, the port is monitoring and documenting the efficiency of a confined disposal project at Terminal 91. Information from this project will assist in siting and designing environmentally acceptable confined disposal sites.
- **Petroleum product contamination**
  - Terminal 18 - The port is studying the extent of groundwater and soils contamination by petroleum products remaining in this area, the site of a former Shell Company tank farm.
  - Terminal 30 - The port is continuing to remove underground petroleum products from this area, the site of a former Chevron Company tank farm.
  - Terminal 91 - This active facility has been operated as a tank farm since the late 1920s, for most of that time by the Navy. The port is reviewing the tenant's submittals for its Part B RCRA permit. Also at Terminal 91, the port and the tenant have cooperated in moving and modifying oil transfer operations and installing additional protective booms to minimize the impacts of spilled oil in the area.
  - All terminals - The port is continuing to evaluate the need for retaining underground storage tanks and removing all unused and unneeded tanks. The port has also assured that spill prevention, control, and countermeasures (SPCC) plans are developed and in effect for all applicable above-ground tanks.
- **Storm drains and CSOs.** At Terminal 91, the port is conducting a study of the impacts of CSOs and storm drains adjacent to its mitigation site and is developing a master map of the tributary drainages for facilitating source control. This task has enabled the port to assist the responsible agencies in focusing resources on source control in this area. These efforts are ongoing. The port also has recently completed an investigation of storm drain operations and management practices at port properties along the Duwamish River and East and West Waterways. The port is evaluating the results and recommendations of the investigation and is planning projects for instituting the recommendations.

## SITE-SPECIFIC ACTION PLAN

Potential and known contaminant sources in the Elliott Bay project area can be divided into two categories: 1) those that discharge to a CSO or storm drain, and 2) those that discharge directly to waters of the project area. Because of limited resources,

all known potential contaminant sources discharging to a CSO or storm drain cannot be investigated or controlled at once. It is therefore necessary to develop a strategy for phasing source investigations and phasing the implementation of control measures.

Six priority drains discharge to priority problem areas:

- S.W. Lander CSO/SD (105)
- S.W. Hanford CSO/SD (162)
- S.W. Florida CSO/SD (098)
- Fox S. CSO/SD (116)
- Michigan CSO (W039)
- Michigan SD.

Four priority drains discharge to waters outside priority problem areas:

- Slip 4 CSO/SD (117)
- Duwamish SD
- Slip 6 SD
- S. 96th Street SD.

The S.W. Florida CSO/SD (098) and the S. 96th Street SD are recommended by Tetra Tech (1988) for inclusion on the list of high priority drains because specific sources of contamination have been identified in the drainage basins. Although contamination was not found in the drain sediments during sampling conducted in 1985, information obtained from Metro and Ecology indicate that there are ongoing sources of contamination in both basins.

Lander CSO/SD (105) and Hanford CSO/SD (162) will be investigated by the city of Seattle as part of EPA's Harbor Island Superfund project. The proposed study includes sampling of drain sediments (seven stations at Lander CSO/SD and nine at Hanford CSO/SD), sampling of drain discharges (as needed to confirm contaminant sources), and field verification of drain layout. The S.W. Florida CSO/SD (098) will be further investigated by Ecology, including investigation of recontamination found by Metro in 1986 (drain sediment was removed in 1984), and investigation of potential surface runoff contamination from the Wyckoff property. The Fox S. CSO/SD (116) is not currently scheduled for investigation by the city of Seattle. The Michigan CSO (W039) is not currently scheduled for investigation by Metro. The Michigan SD basin includes one site, Chempro, that is listed in the Comprehensive Environmental Response, Compensation and Liability Act Information System (CERCLIS) and has been investigated by Ecology.

Sediments in the Slip 4 CSO/SD (117) are known to be contaminated by PCBs. However, no potential PCB sources have been identified. The Duwamish SD sediments are contaminated with heavy metals. Ecology plans to investigate the Duwamish Shipyard property (via NPDES permit) as a potential source of metals in Duwamish SD sediments. Two potential sources of contamination have been identified in the Slip 6 drainage but

have not been investigated. Several documented and potential contaminant sources are present in the S. 96th Street SD drainage basin. One documented source (Precision Engineering) will sample the drain near its facility (sampling medium not known).

In summary, only three priority drainages are scheduled for needed source characterization work. One of the ongoing tasks of the IAWG is to further refine priorities and secure commitments from participating agencies for performing additional source identification and implementing source control measures as needed.

Table 1 presents the Action Plan for EBAT and associated agencies as of 1988. Problem areas and problem stations (Figure 4) correspond to those defined by PTI and Tetra Tech (1988). Sources listed in Table 1 are those identified by:

- The Interim Work Plan for Elliott Bay (Tetra Tech 1985b)
- The Evaluation of Potential Contaminant Sources report (Tetra Tech 1988)
- Members of the IAWG.

Sources are organized according to drainage (i.e., CSO or storm drain) if they 1) discharge to the sanitary sewer system (CSO) or 2) discharge surface runoff to a storm drain or combined CSO/storm drain. Sources with potential direct pathways to waters of the project area (i.e., direct discharge of wastewater or surface runoff, or transport of contaminated groundwater) are listed individually. Table 1 also lists facilities with Metro pretreatment permits and facilities identified as potential hazardous waste sites under Superfund (CERCLIS sites). Some facilities are listed as potential sources in more than one problem area or problem station because they may contribute contaminants by more than one pathway.

Information provided in the Status column was compiled by Ecology based on documents that are on file in the agency's northwest regional office. The six drains that discharge to priority problem areas are identified as high priority under the Status column in Table 1. Other drains are identified as medium or low priority based on their relative ranking by Tetra Tech (1988).

The 1988 Action Plan does not include potential or planned source identification and source control actions in priority drainages outside problem areas [i.e., Slip 4 CSO/SD (117), Duwamish SD, Slip 6 SD, and S. 96th Street SD]. The Implementation Date column in Table 1 documents actual and projected start/finish dates for each action.

The information presented in Table 1 reflects input on activities and commitments received from IAWG members. Problem Stations AB-01, KG-05, KG-06, and DR-16 do not appear in Table 1 because there are no identified potential sources associated with them.

Appendix A contains a summary of the source evaluations reported by Tetra Tech (1988). Appendix B contains detailed source-related information compiled by Ecology from documents on file in the agency's northwest regional office. EBAT commitments under the water quality and hazardous waste investigations and cleanup programs for fiscal year 1989 (1 July 1988-30 June 1989) are summarized in Appendix C. The program-related investigations consist of site inspections at NPDES-permitted facilities, permit reviews, and coordination of remedial actions and enforcement activities at contaminated sites.

TABLE 1. SITE-SPECIFIC ACTION PLAN FOR ELLIOTT BAY  
PRIORITY PROBLEM AREAS

Seattle South Waterfront Problem Area

| Potential Source           | Status   | Actions   | Responsible Entity | Implementation Date |
|----------------------------|--|---|--------------------|---------------------|
| Vine CSO (069)             | Low priority. Offshore sediments at Station SS11 exceeded HAET for HPAH.   | Reduce CSOs from 30 per year to 1 per year, and from 3.3 Mgal/yr to 0.1 Mgal/yr   | City of Seattle    | 2001                |
| Metro pretreatment permits |  |   |                    |                     |
| Queen City Plating         | Major discharge. Metal finisher.<br>Hazardous waste: small quantity generator trichloroethylene liquid and sludge  |   | Metro              |                     |
| Bavarian Meat Products     | Minor discharge  |   |                    |                     |
| Dressel-Collins Fish       | Minor discharge  |   |                    |                     |
| Sterling Engraving         | Minor discharge  |   |                    |                     |
| Seattle Post-Intelligencer | CERCLIS site   |   |                    |                     |
| Maritime Building          | CERCLIS site   |   |                    |                     |
| Unocal                     | Bulk petroleum storage facility from early 1900s to 1975<br>Pathway: groundwater<br>Several historical spills<br>Site investigations completed 1981 and 1987<br>All above-ground tanks, warehouses, and sheds have been removed; some underground tanks and pipelines remain | Demolish remaining structures and pull remaining tanks and subsurface installations.<br>Excavate/treat contaminated soils onsite.<br>In situ bioremediation of offsite areas. | Ecology/Unocal     | 1989                |
| King CSO (W028)            | Offshore station near outfall (SS03) exceeded HAET for HPAH, Cu, Zn, benzyl alcohol, 1,4-dichlorobenzene, dimethyl phthalate   | Reduce overflows from 31 per year to 1 per year, and from 70 Mgal/yr to 0.5 Mgal/yr   | Metro              | 2005                |
| Metro pretreatment permits |  |   |                    |                     |
| Norfin, Inc.               | Major discharge. Manufacturer of printed circuit boards.   |   | Metro              |                     |
| Chromium, Inc.             | CERCLIS site   |   |                    |                     |
| Seattle Steam              | Western Avenue: boiler blowdown reportedly routed to sanitary as of 3/88<br>Post Avenue: all flows now routed to sanitary sewer. Seattle Steam requested permit cancellation on 3/2/88.  | Site inspection, review/revise permit   | Ecology            | FY 89               |
| R. Breese Jones            | Antique dealer   | Referred to Metro Industrial Waste 12/85  | Metro              |                     |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## Seattle South Waterfront Problem Area (continued)

| Potential Source  | Status   | Actions  | Responsible Entity                              | Implementation Date |
|---|--|--|---|---------------------|
| Piers 37-70   | Berthing facilities are potential sources due to minor ship maintenance and spills   | Collect and analyze sediment samples and evaluate the potential for sediment remediation   | Metro   | 1988                |
| University CSO (070)  | Offshore sediments at Station SS-06 exceeded HAET for LPAH and HPAH                  | Partial separation, inlet modification. Reduce overflows from 2.8 Mgal/yr to 0.16 Mgal/yr with one overflow event per year remaining. Investigate potential sources in basin. Sample sediment in CSO.  | City of Seattle                                 | 2001                |
| Madison CSOs (071 and 164)                                  | Offshore sediments at Station SS-05 exceeded HAET for LPAH, HPAH, and Ag             | Partial separation, inlet modification. Reduce overflows from 0.7 Mgal/yr to 0.04 Mgal/yr with one overflow event per year remaining. Investigate potential sources in basin. Sample sediment in CSO.  | City of Seattle                                 | 2001                |
| Columbia CSO (172)  | No nearshore sediment stations. Emergency overflow only.                             |  | City of Seattle                                 |                     |
| Washington CSO (072)  | Offshore sediments at Station SS-04 exceeded HAET for LPAH, HPAH, DDT, DDD, and DDE  | Partial separation, inlet modification. Reduce overflows from 0.8 Mgal/yr to 0.005 Mgal/yr with one overflow event per year remaining. Investigate potential sources in basin. Sample sediment in CSO. | City of Seattle                                 | 2001                |
| Connecticut CSO (W029)                                      | No nearshore sediment stations   | Reduce overflows from 90 Mgal/yr with 5-10 overflow events per year remaining  | Metro   | 2005                |
| Waterfront structures (Coleman Dock - old Wyckoff facility) | Low priority. Potential historical sources or present sources due to past practices. | As sources are identified, refer for PA/SI and hazard ranking. Continue implementing spill prevention, control, and cleanup activities.  | EPA, Ecology, City of Seattle, U.S. Coast Guard | Ongoing             |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
 FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## North Harbor Island I Problem Area

| Potential Source           | Status  | Actions   | Responsible Entity                      | Implementation Date |
|----------------------------|---|---|---|---------------------|
| 11th Avenue S.W. CSO (077) | Low priority. Emergency overflow/SD.<br>No HAET exceedances in offshore sediments.  | Implement work plan for source investigation/<br>sediment characterization            | HI Superfund,<br>EPA/City of<br>Seattle | 10/88               |
| Metro pretreatment permits |   |   |   |                     |
| Seafab                     | Major discharge (see West Waterway I)   |   |   |                     |
| Lockheed Plant I           | Minor discharge   |   |   |                     |
| Puget Sound Tug and Barge  | Pathway: groundwater, SRO<br>CERCLIS site: low priority   |   |   |                     |
| Texaco                     | Pathway: groundwater<br>CERCLIS site: low priority  | EPA remedial investigation (see West Waterway II for other investigations by Ecology) | HI Superfund,<br>EPA/Texaco             | Ongoing             |
| Mobil                      | Pathway: SRO, groundwater<br>NPDES permit: SRO<br>On Ecology's hazardous site list for petroleum<br>Inspection report - little activity, area clean, four tanks active                  | Update bulk petroleum storage facilities<br>NPDES permits                             | Ecology                                 | FY 89               |
| Todd Shipyards             | Pathway: SRO, fugitive emissions<br>NPDES permit: new permit being issued<br>UST: mineral spirits and Stoddard solvent (VOAs) tank leaks adjacent to West Waterway. Tanks removed 9/86. | Inspect/renew NPDES permit<br>Investigate groundwater contamination                   | Ecology<br>HI Superfund<br>Todd         | FY 89               |
| Lockheed Plant II          | Pathway: SRO (private SDs), fugitive emissions<br>Facility closed, equipment sold   | Inspect/cancel permit<br>Conduct soils and groundwater investigation                  | Ecology<br>HI Superfund/<br>Lockheed    | FY 89               |
| Private storm drains       | Potential sources, many poorly characterized  | Continue source identification and sample<br>key storm drains                         | HI Superfund,<br>EPA/City of<br>Seattle | 1988/1989           |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.

FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## North Harbor Island II Problem Area

| Potential Source       | Status  | Actions   | Responsible Entity | Implementation Date |
|------------------------|---|---|--------------------|---------------------|
| Lower Longfellow Creek | Medium priority<br>Lower basin (120 acres) discharges to NHI II, upper basin (1,400 acres) routed to S.W. Hinds CSO/SD (099). Under flow conditions, overtops diversion and floods Seattle Steel property and discharges to Elliott Bay.<br>Lower basin includes: Seattle Steel (NPDES permit for cooling pond overflow), Purdy scrap yard (SRO, groundwater), West Seattle landfill, Zandt Brass (SRO).  |   |                    |                     |
| Purdy scrap yard       | Pathway: groundwater, SRO to S.W. Florida CSO/SD (098) and Longfellow Creek. 10/84 Metro traced PCB contamination in S.W. Florida CSO/SD (098) to Purdy property.<br>PCB contamination on Purdy property not confirmed.   | Nothing planned pending sale of property or action on West Seattle Landfill |                    |                     |
| Seattle Steel          | Pathway: groundwater, NPDES permitted discharge to lower Longfellow Creek<br>NPDES permit: expires 1988; cooling pond overflow<br>CERCLIS site<br>9/85: Bethlehem Steel removed 3,000 tons of soil/debris (flue dust) from dangerous waste pile north of S.W. Spokane Street. Sent to Arlington. Excavated to background levels for Cr, Cd, and Pb.<br>Electric arc furnace and new water coolant system for baghouses installed in 1987<br>Oil problems: plans to upgrade rolling mill (major source of oils)<br>Inspection reports: 6/17/87 junction box to Longfellow Creek full of sediment: scale pit for continuous caster modified to prevent overflows to junction box, new oil skimmer ordered for scale pit | Inspect/reissue NPDES permit, sample effluent                               | Ecology            |                     |
| Zandt Brass Foundry    | Pathway: SRO to lower Longfellow Creek, groundwater<br>Sandcasting wastes contain metals and CNs and are landfilled in back of foundry  | Negotiate site cleanup with Zandt   | Ecology            | Ongoing             |
| West Seattle Landfill  | Pathway: groundwater, SRO to lower Longfellow Creek<br>CERCLIS site: low priority<br>Operated 1939-1966, 20-acre site<br>Received municipal wastes, steel mill wastes, fertilizer plant wastes, and probably other industrial waste   |   |                    |                     |
| Wyckoff Company        | Pathway: groundwater, SRO to Elliott Bay and S.W. Florida CSO/SD (098), direct discharge to Elliott Bay<br>Elliott Bay Action Plan data: offshore sediments exceed HAET/90th percentile for LPAH and HPAH<br>7/88: EPA takes over sampling at Wyckoff - soils, water, sediment, oils, and groundwater (20 monitoring wells exist on site)   | Inspect/issue NPDES permit<br>Enforce RCRA 3013 order                       | Ecology<br>EPA     | FY 89<br>Ongoing    |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## West Waterway I Problem Area

| Potential Source   | Status   | Actions   | Responsible Entity                           | Implementation Date |
|--|--|---|--|---------------------|
| S.W. Spokane CSO/SD (102), CSO (103), 16th Avenue S.W. CSO/SD (104)                                | (102): medium priority<br>(102 and 103): offshore sediments at Station WW01 exceed HAET for benzyl alcohol. Main problem: biological hits.<br>(104): medium priority. Offshore sediments at Station WW04 exceeded HAET for LPAH and HPAH.<br>(102, 104): serve as emergency overflows for southern half of Harbor Island<br>(103): assume medium priority (no data available). Serves as emergency overflow for all of Harbor Island.<br>(102, 104): serve as SDs                      | (102, 103, and 104): develop work plan for source investigation/sediment characterization   | City of Seattle                              | 10/88               |
| Metro pretreatment permits   |  |   |  |                     |
| Seafab   | Major discharge: 160,000 gpd industrial waste, 25,000 gpd sanitary<br>Seafab is now authorized to discharge to sanitary (by Metro), but has no pretreatment permit<br>Laundry, interior floor drain, roof drains, pot cooling water discharges direct to West Waterway via S.W. Lander CSO/SD (105). Toilets and showers to sanitary sewer.<br>SRO from site collected, discharged to holding tank (treated if necessary) and discharged to sanitary sewer (also see West Waterway II) | Reroute flows to sanitary sewer<br>Revise Metro pretreatment permit<br>Comply with RCRA 3013 order to investigate soils and groundwater contamination | Seafab/Ecology<br>Seafab/Metro<br>Seafab/EPA | 10/88               |
| Fisher Flour<br>Pacific Rendering<br>Jacob Stern<br>Lockheed<br>Aspen Paint/Asahipen America, Inc. | Minor discharge<br>Minor discharge<br>Minor discharge<br>Minor discharge<br>Minor discharge  |   |  |                     |
| Meltec   | Manufactures machine parts from scrap steel/alloys<br>Noncontact cooling water from arc furnaces, effluent from quench tank, and SRO discharged to S.W. Spokane CSO/SD (102)   | Inspect/issue NPDES permit or hookup to sanitary sewer with Metro pretreatment permit   | Ecology                                      | FY 90               |
| Mono Roofing   | Pathway: SRO to S.W. Spokane CSO/SD (102)<br>Operated since 1980<br>4/10/86: Mono Roofing stopped using ZnO <sub>2</sub><br>11/18/86: turbid water discharged to West Waterway from S.W. Spokane CSO/SD (102) from Mono Roofing (hose connections discharged to CB) - NOV issued   | Issue Administrative Order, implement BMPs  | Ecology/<br>Mono Roofing                     | FY 89               |
| Seattle Paint/Aspen Paint/Asahipen America, Inc.   | CERCLIS site: low priority<br>Manufactures latex and alkyd type paint products (about 80 percent of paints are water-based)<br>Wastewater treated in series of settling tanks before discharge to sanitary sewer   |   |  |                     |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.



TABLE 1. (Continued)

## West Waterway I Problem Area (continued)

| Potential Source                    | Status   | Actions  | Responsible Entity   | Implementation Date |
|-------------------------------------|--|--|----------------------|---------------------|
| Fisher Flour                        | Pathway: private SDs<br>NPDES permit: 75,000 gpd maximum; 001 - noncontact cooling water;<br>002 - groundwater, noncontact cooling water, boiler blowdown<br>8/8/86: boiler blowdown routed to Metro, eliminated SD discharge,<br>no longer use water to cool roller mills   | Inspect, institute BMPs  | Ecology              | FY 89               |
| Lockheed Plant I                    | See West Waterway II for description   |  |                      |                     |
| Columbia Cement Northwest (Tilbury) | Pathway: private drains<br>NPDES permit: expires 1986; noncontact cooling water truck washwater to West Waterway (26,000 gpd average; 40,000 gpd maximum)<br>Filed Chapter 7 bankruptcy 2/1/88 (now Tilbury Cement)  | Inspect, revise/reissue NPDES permit   | Ecology              | FY 89               |
| Terminal 5                          | Pathway: SRO (private SDs), groundwater<br>10,000 yd <sup>3</sup> soils excavated and stored at Terminal 105<br>Soils approved for disposal at Coal Creek landfill 8/5/86<br>Redevelopment completed in 1986   | Inspect, issue NPDES permit for storm drains   | Ecology              | FY 90               |
| West Seattle Landfill               | See Harbor Island II   |  |                      |                     |
| Harbor Island Business Park         | Pathway: groundwater, SRO<br>High priority: on Ecology's list of hazardous waste sites<br>Basic research, production of plywood glues and proteinaceous resins until 1978<br>McKinstry Company hired to seal piping in old lab portion of building: industrial piping cut to floor line, openings plugged with concrete, pipe exiting building cut and end plugged. Completed 1/23/87. | Investigate groundwater and soil contamination   | HI Superfund/<br>EPA |                     |
| Crosby and Overton                  | CERCLIS site   |  |                      |                     |
| S.W. Hinds CSO/SD (099)             | Medium priority. Offshore sediments at Station MW-06 exceeded HAET for LPAH. Exceeded LAET for Pb, Hg, Zn, PCBs, HPAH, and butyl benzyl phthalate.   | Construct 37 acre-foot detention basin in upper Longfellow Creek basin (at West Seattle Golf Course), culvert/pipe replacement, channel improvements | City of Seattle      |                     |
| Chelan CSO (W036)                   | No stations immediately offshore of CSO  | Reduce overflows from 25 Mgal/yr to 4 Mgal/yr, from 16 events per year to 2-5 events per year  | Metro                |                     |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## West Waterway II Problem Area

| Potential Source                                       | Status   | Actions  | Responsible Entity                        | Implementation Date  |
|--|--|--|---|----------------------|
| S.W. Lander CSO/SD (105),<br>S.W. Florida CSO/SD (106) | (105, 106): serve as emergency overflows for north half of Harbor Island<br>(105): high priority. Offshore sediment at Station WW14 exceeded HAET for HPAH and Pb. SD serves 54 acres.<br>(106): medium priority. Offshore sediment at Station WW18 exceeded HAET for HPAH. SD serves 40 acres.  | City of Seattle and Metro will sample seven stations along S.W. Lander CSO/SD (105) to track Pb problems, use TV camera to inspect lines, plan to pave additional parking lots near old smelter to control dust, clean drain lines | HI Superfund<br>City of Seattle/<br>Metro | 10/88                |
| Metro pretreatment permits                             |  |  |   |                      |
| Seafab   | Major discharge (see West Waterway I)  |  | HI Superfund,<br>EPA/City of<br>Seattle   |                      |
| Lockheed Shipbuilding<br>Plant I                       | Minor discharge  |  |   |                      |
| Seafab   | Pathway: SRO to S.W. Lander CSO/SD (105), air, groundwater<br>Secondary Pb smelter since 1937. Smelting and refining operations ceased 1/84. Currently operates as Pb fabricator: furnaces, cold rolling mill, Pb oxide plant.<br>CERCLIS site<br>1975-1982: wastewater from treatment plant discharged to impoundment. Impoundment has permeable base.<br>2/82: all wastewater from treatment plant discharged to sanitary sewer<br>SRO from plant area: to storage tank onsite (treated if needed) to sanitary sewer<br>1984: 250-300 tons sediment excavated from impoundment<br>1985: 200 tons sediment excavated from impoundment<br>1986: waste piles removed (battery chips, diatomaceous earth filter waste)<br>1987: NPDES permit cancelled (SRO and noncontact cooling water to sanitary). EPA issued 3013 RCRA order to investigate entire site.<br>1988: revised closure plan for impoundment submitted - fill, impermeable cap, groundwater monitoring. Seafab submitted plan for soil and groundwater plan for investigation of entire site.<br>8/30: site inspection (laundry, interior floor drain (by water fountain), roof drains, pot cooling water discharges to West Waterway via S.W. Lander CSO/SD (105)) | Complete closure/monitoring of impoundment<br>Seafab replumb laundry, pot room, floor drain, roof. Drains to sanitary sewer.<br>Comply with RCRA 3013 order to investigate soils and groundwater contamination                     | Seafab/<br>Ecology<br><br>Seafab/EPA      | Ongoing<br><br>10/88 |
| Texaco   | Pathway: SRO to S.W. Lander CSO/SD (105), groundwater<br>NPDES permit: SRO and tank drawdown<br>CERCLIS site: medium priority<br>Preliminary assessment (5/7/85): recommended soil borings to assess soil contamination, continue groundwater monitoring   | Update bulk petroleum storage facilities<br>NPDES permits<br>Remedial investigation  | Ecology<br><br>HI Superfund/<br>EPA       | FY 90<br><br>Ongoing |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## West Waterway II Problem Area (continued)

| Potential Source                 | Status   | Actions   | Responsible Entity              | Implementation Date |
|----------------------------------|--|---|---------------------------------|---------------------|
| Shell                            | NPDES permit: treated SRO and tank water drawdown<br>On Ecology's hazardous site list as high priority for petroleum<br>Two outfalls: both discharge via oil/water separators to S.W. Lander CSO/SD (105)  | Update bulk petroleum storage facilities<br>NPDES permits<br>Remedial investigation | Ecology<br>HI Superfund/<br>EPA | FY 89<br>Ongoing    |
| Pacific Wire                     | Pathway: SRO, noncontact cooling water to S.W. Lander CSO/SD (105)<br>Manufactures fabricated wire products from mild and stainless steel<br>NPDES permit: application filed 3/24/86<br>Three discharges (noncontact cooling water, stormwater runoff):<br>1. Air compressor, resistance welders: 3,780 gpd<br>2. Resistance welder: 4,094 gpd (intermittent discharge)<br>3. SRO from roof, south loading dock, driveway, parking/<br>storage area: 4,175 gallons/hour (maximum capacity of<br>sump pump; intermittent discharge) | Inspect, issue NPDES permit   | Ecology                         | FY 90               |
| Arco                             | Pathway: private SDs, groundwater<br>NPDES permit: SRO; expires 1989; six SDs serving parking lots and<br>roadways untreated, two oil/water separators treat tank farm<br>area (equipped with oil sensors/alarms)  | Update bulk petroleum storage facilities<br>NPDES permits<br>Remedial investigation | Ecology<br>HI Superfund/<br>EPA | FY 89               |
| Lockheed Shipbuilding<br>Plant 1 | Pathway: private SDs, groundwater<br>NPDES permit: SRO; expired 1980, no renewal, facility closed<br>CERCLIS site: low priority  | Inspect/cancel permit   | Ecology                         | FY 89               |
| Lockheed Shipbuilding<br>Plant 2 | See North Harbor Island I  |   |                                 |                     |
| S.W. Florida CSO/SD (098)        | Emergency overflow<br>High priority due to ongoing contamination from SRO from Wyckoff<br>property (also see North Harbor Island II)<br>Offshore sediment at Station WW17 exceeded HAET for HPAH<br>City of Seattle removed contaminated sediments from lines in 1985  | Conduct source investigation in drainage basin                                      | Ecology                         | FY 89               |
| Aspen Industries                 | Manufactures thermal windows<br>Ecology inspection report (6/12/86): stains on blacktop and near<br>catchbasin. Catchbasin either connects to S.W. Bronson SD to<br>Elliott Bay or to combined sewer on S.W. Harbor Avenue to S.W.<br>Florida CSO/SD (098).  |   |                                 |                     |
| Purdy Recycling                  | See North Harbor Island II   |   |                                 |                     |
| West Seattle Landfill            | See North Harbor Island II   |   |                                 |                     |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## Problem Station NS-01

| Potential Source            | Status   | Actions  | Responsible Entity | Implementation Date |
|-----------------------------|--|--|--------------------|---------------------|
| Denny Way CSO (W027)        | Low priority. Offshore sediments exceeded HAET for Ag.     | Achieve partial sewer/stormwater separation in Denny Way local area and area tributary to Lake Union Tunnel. Reduce CSOs from 51/yr to <10/yr and flow from 370 Mgal/yr to 67 Mgal/yr. | Metro              | 1993-1999           |
|                             |  | Remove contaminated sediment from sewer line   | Metro              | 8/89                |
|                             |  | Remove contaminated sediment from sewer line   | City of Seattle    | completed 1988      |
|                             |  | Cap contaminated offshore sediments with clean material  | Metro              | 3/90                |
| Metro pretreatment permits  |  |  |                    |                     |
| Mastercraft Metal Finishing | Metal finishing and electroplating                         |  |                    |                     |
| Maryatt Laundry             | Major discharge: 5,400 gpd industrial and 210 gpd sanitary |  |                    |                     |
|                             | Industrial laundry   |  |                    |                     |
|                             | Major discharge  |  |                    |                     |
|                             | New pretreatment system installed 9/86                     |  |                    |                     |
| Overall Laundry             | Industrial laundry   |  |                    |                     |
|                             | Major discharge  |  |                    |                     |
| Queen City Plating          | See South Seattle Waterfront                               |  |                    |                     |
| Ashbrook Ruth Bakeries      | Minor discharge  |  |                    |                     |
| Granny Smith's Ovens        | Minor discharge  |  |                    |                     |
| Coolidge Propeller          | Minor discharge  |  |                    |                     |
| E&E Meats                   | Minor discharge  |  |                    |                     |
| Floyd Lee Color Lab         | Minor discharge  |  |                    |                     |
| Forde Motion Picture Labs   | Minor discharge  |  |                    |                     |
| Martin Tackle               | Minor discharge  |  |                    |                     |
| Pacific Northwest Bell      | Minor discharge  |  |                    |                     |
| Petschis Quality Meat       | Minor discharge  |  |                    |                     |
| Ratelco                     | Minor discharge  |  |                    |                     |
| Richardson and Holland      | Minor discharge  |  |                    |                     |
| Seattle Times               | Minor discharge  |  |                    |                     |
| United Graphics             | Minor discharge  |  |                    |                     |
| Bavarian Meat Products      | Minor discharge  |  |                    |                     |
| Consolidated Dairy          | Minor discharge  |  |                    |                     |
| Dresser-Collins Fish        | Minor discharge  |  |                    |                     |
| Mirror Like                 | Minor discharge  |  |                    |                     |
| Sterling Engraving          | Minor discharge  |  |                    |                     |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.

FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## Problem Station WS-01 (continued)

| Potential Source           | Status   | Actions                         | Responsible Entity | Implementation Date |
|----------------------------|--|---------------------------------|--------------------|---------------------|
| Seattle Post-Intelligencer | CERCLIS site (see South Seattle Waterfront)  |                                 |                    |                     |
| Unocal                     | See South Seattle Waterfront   |                                 |                    |                     |
| Maritime Building          | CERCLIS site (see South Seattle Waterfront)  |                                 |                    |                     |
| Dan's Paints               | CERCLIS site   |                                 |                    |                     |
| Fiberlay                   | CERCLIS site   |                                 |                    |                     |
| Monterey Apartments        | Pathway: groundwater and sanitary sewer<br>On Ecology's hazardous site list<br>Product recovery well installed (by Ecology) at Arnold's Mini Mart 7/87 | complete remedial investigation | Ecology            | FY 89               |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## Problem Station EW-05

| Potential Source               | Status   | Actions  | Responsible Entity | Implementation Date    |
|--------------------------------|--|--|--------------------|------------------------|
| Hanford 2 CSO (W032)           | Medium priority. Offshore sediments exceeded MAET for Cd, Hg, PCB, butyl benzyl phthalate, DDT, DDE, and 1-methylphenanthrene. Pb, Zn exceeded LAET. Chlordane, retene, Ag, di-n-octyl phthalate exceeded 90th percentile. | Reduce CSO from 270 Mgal/yr to 40 Mgal/yr  | Metro              | 1986-1992              |
| Metro pretreatment permits     |  |  |                    |                        |
| Buffalo Sanitary Wipers        | Major discharge  |  |                    |                        |
| Alaskan Copper Works           | Minor discharge  |  |                    |                        |
| Booth Fisheries                | Minor discharge  |  |                    |                        |
| C&H Sugar                      | Minor discharge  |  |                    |                        |
| Crescent Manufacturing         | Minor discharge  |  |                    |                        |
| Crowley Environmental          | Minor discharge  |  |                    |                        |
| Garrett Freight                | Minor discharge  |  |                    |                        |
| Rainier Brewery                | Minor discharge  |  |                    |                        |
| Rainier Port Cold Storage      | Minor discharge  |  |                    |                        |
| Ash Grove                      | Cement plant<br>CERCLIS site<br>State groundwater permit   | Inspect  | Ecology            | FY 90                  |
| Crowley Environmental Services | Environmental cleanup contractor<br>CERCLIS site<br>RCRA status: 6/85 - no longer classified as hazardous waste storage facility; hazardous materials stored on site <90 days  |  |                    |                        |
| City Light Storage             | CERCLIS site   |  |                    |                        |
| Lander CSO (W030)              | Low priority. Offshore sediment contamination at Station EW-05 [see Hanford 2 CSO (W032)].   | Partial sewer separation project, construct new regulator station<br>Implement source identification/control program in service area | Metro              | 1986-1992<br>1988-1989 |
| Metro pretreatment permits     |  |  |                    |                        |
| Austin Mac                     | Major discharge<br>Inspection report (7/29/86): acid dip tank for stainless steel discharged to ground   |  |                    |                        |
| Industrial Plating             | Major discharge; permit expires 1990<br>Industrial wastewater: 100,000 gpd; sanitary: 2,000 gpd  |  |                    |                        |
| K & N Meats                    | Minor discharge  |  |                    |                        |
| Oberto Sausage                 | Minor discharge  |  |                    |                        |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## Problem Station EW-05 (continued)

| Potential Source                      | Status   | Actions   | Responsible Entity                            | Implementation Date   |
|---------------------------------------|--|---|---|-----------------------|
| Pacific Iron and Metals               | Pathway: SRO<br>Nonferrous and precious metals recycler, currently recycles only Al and Cu<br>Operated since 1929<br>SRO from site goes through two sumps/drains to city combined sewer system in Lander CSO (W030) service area<br>PCB/Pb contamination found in two sumps<br>6/87: drain lines on property cleaned (3-inch and 6-inch lines: pumped all CBs, cleaned all pipes with detergent, cleaned all CBs with high-pressure wash and degreaser)  |   |   |                       |
| Terminal 30 (Chevron/Port of Seattle) | Chevron operated tank farm from 1930s to 1985<br>1984: Chevron/Ecology initiated product recovery program: Free product remains in areas near recovery wells not adjacent to East Waterway. Soils saturated with product isolated from waterway with clean fill.   | Inspect/implement BMPs, possible stormwater permit<br>Complete product recovery operations                              | Ecology<br>Port of Seattle                    | FY 89<br>Ongoing-1989 |
| S.W. Hanford CSO/SD (162)             | High priority<br>Emergency overflow serving south end of Harbor Island. Storm drain basin: 70 acres.<br>Contamination in offshore sediments [see Hanford 2 CSO (W032)]   | Implement work plan for source investigation/ sediment characterization   | HI Superfund<br>EPA/City of Seattle           | 10/88                 |
| Metro pretreatment permits            |  |   |   |                       |
| Seafab                                | Major discharge (see West Waterway II)   |   |   |                       |
| Value Metal Plating                   | Permit cancelled 6/85 (installed a recycling system), connection to sewer sealed   | Inspect to verify no discharge  | Ecology                                       | FY 90                 |
| Fisher Mills                          | Minor discharge  |   |   |                       |
| Pacific Rendering                     | Minor discharge  |   |   |                       |
| Jacob Stern                           | Minor discharge  |   |   |                       |
| Seattle Iron and Metals               | Pathway: SRO, groundwater<br>Metal recycler. Operated since 1949. Prior to 1949, property owned by Navy.<br>PCBs: received transformers from City Light nine times from 4/79-1/84. Reported that transformer oil usually drained before transformers received; otherwise oil drained and reclaimed by Petroleum Reclaiming Service.<br>Letter of 2/25/86 to Ecology: as of 1/17/86, Cu washwater no longer discharged to SD (dry methods used). Cu ash awaiting shipment now stored in covered containers. Underground storage tank for SRO removed. | Issue NPDES permit with sampling requirements<br>Investigate PCB contamination<br>Investigate groundwater contamination | Ecology<br>EPA Toxics Program<br>HI Superfund | FY 90                 |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## Problem Station EW-05 (continued)

| Potential Source              | Status   | Actions  | Responsible Entity                     | Implementation Date         |
|-------------------------------|--|--|--|-----------------------------|
| Value Metal Plating           | <p>Inspection reports:</p> <p>3/11/88: extensive chemical spillage on floor inside (about 10 gallons of Ni plating solution) and evidence of outdoor spills. Closed loop system: parts not always drained over plating tank (spills). Chemical storage inadequate - no berms, some containers stored in unpaved area, no roof, leaking drums observed.</p> <p>6/86: Value Metal Plating installed concrete pad for storage of wastes/raw materials, sump cleaned out by Crosby and Overton</p> | <p>Inspect to verify no discharge</p> <p>Remedial investigation, preliminary soil sampling</p> | <p>Ecology</p> <p>HI Superfund EPA</p> | <p>FY 90</p> <p>Ongoing</p> |
| Harbor Island Business Center | See West Waterway II   | Inspect  | Ecology                                | FY 89                       |
| Non-Ferrous Metals            | <p>Pathway: SRO to S.W. Hanford CSO/SD (162)</p> <p>On Ecology's hazardous site list for metals</p> <p>CERCLIS site</p> <p>Inspection reports</p> <p>Ecology (3/6/87): drums of Pb dross, fluorescent light ballast, transformers, Ni-Cd batteries stored onsite in uncontained area</p>   | <p>Remedial Investigation, preliminary soil sampling</p>                                       | <p>HI Superfund/EPA</p>                | Ongoing                     |
| S.W. Florida SD (36-inch)     | Low priority   |  |  |                             |
| Shell                         | <p>SRO and tank drawdown from tank farm discharged to S.W. Florida in 1970s. Portion of tank farm on Terminal 18 demolished for container terminal.</p> <p>On Ecology's hazardous site list for petroleum</p>  |  |  |                             |
| S.W. Lander SD (15-inch)      | Low priority   |  |  |                             |
| Pacific Wire Works            | See West Waterway II   |  |  |                             |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
 FY 89 = 1 July 1988-30 June 1989.



TABLE 1. (Continued)

## Problem Station KG-01

| Potential Source  | Status  | Actions  | Responsible Entity | Implementation Date |
|---|---|--|--------------------|---------------------|
| Brandon CSO (W041)                                      | Medium priority. No HAET exceedances in offshore sediments. LAET exceedances for Zn, Hg, HPAH, butyl benzyl phthalate. Cd, di-n-octyl phthalate exceeded the 90th percentile concentration.   | Reduce overflows from 25 events per year to 1-2 events per year and from 35 Mgal/yr to 6 Mgal/yr | Metro              | 2005                |
| Metro pretreatment permits                              |   |  |                    |                     |
| Art Brass Plating                                       | Major discharge<br>Electroplating with Cr, Cu, Ni, Zn, CN<br>Metro permit expires 1989: 30,000 gpd industrial waste; 980 gpd sanitary<br>Metro inspection (11/4/85): chemicals, waste barrels, unused tanks stored outside on concrete, unbermed pad with CB in middle; material was seeping towards CB; some barrels stored in unlined gravel side-portion of alley  |  |                    |                     |
| Northwest Tank Service/<br>Northwest Enviro-<br>service | Major discharge<br>75,000 gpd industrial waste; 270 gpd sanitary; 200 gpd stormwater runoff<br>RCRA permitted facility<br>Operated since 1969: marine and industrial disposal. Provides cleaning, waste hauling, disposal operations, receives and ships regulated hazardous wastes, stores petroleum products, treats oily wastewater, recycles solvents, and stores regulated wastes.<br>RCRA application filed 2/18/88, but notice of deficiency issued; Ecology requested that Northwest Enviro-service resubmit Part B application by 9/1/88 |  |                    |                     |
| GE Aviation   | Major discharge: aerospace parts repair and metal cleaning<br>2,300-gpd industrial wastewater, 2,500-gpd noncontact cooling water<br>4,340-gpd sanitary wastewater, 100-gpd boiler blowdown   |  |                    |                     |
| International Graphics                                  | Minor discharge   |  |                    |                     |
| Northwest Glass/Incon                                   | Minor discharge   |  |                    |                     |
| Northwestern Glass/Incon                                | NPDES permit: expires 1990; glass container manufacturer<br>Noncontact cooling water: 38,000 gpd (average)<br>Contaminated cooling water to sanitary sewer  |  |                    |                     |
| 8 unidentified drains in<br>Slip 1                      | EPA dive team report (7/30/85): eight pipes found during 7/85 ranging from 6 inches to 2 feet in diameter. Two were subtidal, three intertidal, and three above high tide. All discharged from north side of Slip 1 by Federal Center South.  |  |                    |                     |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## Problem Station DR-12

| Potential Source           | Status  | Actions | Responsible Entity      | Implementation Date |
|----------------------------|---|---------|-------------------------|---------------------|
| Fox CSO/SD (116)           | High priority. Emergency overflow and storm drain serving about 32 acres. Sediment at Station DR-12 exceeded LAET for Pb, PCB, fluoranthene, indeno(1,2,3-c,d)pyrene. As, Zn, and Cu exceeded LAET and 90th percentile. No HAET exceedances. Biological indicators of contamination (score = 75 percent).   |         | City of Seattle Ecology |                     |
| Metro pretreatment permits |   |         |                         |                     |
| Emerson GM Diesel          | Minor discharge   |         |                         |                     |
| Tyee Lumber                | Wood products manufacturer<br>3/25/86 (Ecology): NW Enviroservice had removed 300-gallon pentachlorophenol tank and collected soil samples. Ecology has been unable to obtain sample results.   |         |                         |                     |
| Inland Transportation      | CERCLIS site: waste activities record (spill, transporter, treatment)   |         |                         |                     |
| Campbell Chain             | Warehouse and sales office (chains, shackles, clamps, and fittings)<br>Ecology inspection report (6/18/86): SRO to Duwamish River at Slip 2   |         |                         |                     |
| Marine Power and Equipment | Shipyard<br>NPDES permit: expires 1992<br>New shipyard NPDES permit issued for drydock, synchrolift, pressure washer water, and stormwater runoff<br>BMPs: monthly cleaning of yard; inspect/clean sediment traps in drains on monthly basis; control dust/overspray from sandblast/printing operations<br>Consent Decree (12/87): requires Marine Power and Equipment to comply with NPDES permit<br>8/88: Marine Power and Supply Chapter 11 reorganization plan signed by U.S. judge | Inspect | Ecology                 | FY 89               |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## Problem Station DR-15

| Potential Source                | Status   | Actions  | Responsible Entity | Implementation Date |
|---------------------------------|--|--|--------------------|---------------------|
| S.W. Michigan CSO (W039)        | High priority. Offshore station (DR-15 at head of Slip 2) exceeded 90th percentile concentration for di-n-octyl phthalate. Exceeded LAET for PCBs. Also high score (100 percent) for biological indicators of contamination.                   | Reduce overflows from 31 per year to 1 per year and 250 Mgal/yr to 1 Mgal/yr | Metro              | 2005                |
| Metro pretreatment permits      |  |  |                    |                     |
| Wearcote NW                     | Major discharge<br>Metal finishing/electroless plating<br>7,475-gpd industrial waste; 525-gpd sanitary waste   |  |                    |                     |
| Arrow Transportation            | Major discharge<br>Vehicle maintenance, tank truck cleaning<br>29,220-gpd industrial waste; 780-gpd sanitary waste   |  |                    |                     |
| Viox Corporation                | Major discharge<br>Production of radiation shielding systems and specialty glasses for electronics<br>3,200-gpd industrial waste; 15,100-gpd noncontact cooling water; 1,225-gpd sanitary  |  |                    |                     |
| ABC Metal Finishing             | Major discharge<br>Metal finishing<br>9,685-gpd industrial waste; 315-gpd sanitary waste   |  |                    |                     |
| GE Aviation                     | Major discharge<br>2,300-gpd industrial wastewater; 2,500-gpd noncontact cooling water; 4,340-gpd sanitary wastewater; 100-gpd boiler blowdown   |  |                    |                     |
| And All Electrochrome           | Major discharge - permit cancelled 1985, business shutdown<br>Electroplating with Cr, Cd, CN, Zn<br>9,500-gpd industrial waste; 1,050-gpd sanitary waste   |  |                    |                     |
| Chempro<br>(734 S. Lucille St.) | Major discharge<br>Recycles waste solvents, treats waste CN solutions, treats heavy metal wastes, consolidates/repackages nonrecyclable hazardous wastes, and manufactures alkyd resins<br>16,700-gpd industrial waste; 480-gpd sanitary waste |  |                    |                     |
| Kitty Cat Foods                 | Minor discharge  |  |                    |                     |
| Atwood Adhesives                | Minor discharge  |  |                    |                     |
| Dr. Pepper Bottling Co.         | Minor discharge  |  |                    |                     |
| International Graphics          | Minor discharge  |  |                    |                     |
| Northcoast Chemical             | Minor discharge  |  |                    |                     |
| Rainier Ice                     | Minor discharge  |  |                    |                     |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## Problem Station DR-15 (continued)

| Potential Source                   | Status  | Actions  | Responsible Entity | Implementation Date |
|------------------------------------|---|--|--------------------|---------------------|
| Preservative Paint                 | Pathway: groundwater<br>CERCLIS site: medium priority<br>Preliminary assessment (5/3/85): operated since 1980; manufactures and sells paint, varnish, industrial coatings<br>RCRA status: generation and temporary storage (90 days) of spent, nonhalogenated solvents (about 24 tons/year)   |  |                    |                     |
| Pioneer Enamel                     | CERCLIS site: Preliminary assessment (11/84): operated since 1979; manufactures porcelain enamel<br>1982: Ecology recommended facility be removed from list   |  |                    |                     |
| Chempro<br>(734 S. Lucille Street) | Pathway: groundwater<br>Inspection reports: has active groundwater monitoring program (once per month sampling); 24 underground tanks, four above-ground tanks being constructed to replace existing tanks<br>Ongoing groundwater pump and treatment program<br>Chempro currently negotiating Consent Order with EPA for corrective actions: RCRA facility investigation required (will satisfy Part B application and comply with Superfund's offsite policy)  | Submittal plan for compliance with 3008<br>Consent Order | Chempro/EPA        | 9/88                |
| Northcoast Chemical                | Pathway: SRO, groundwater<br>CERCLIS site<br>NPDES permit: expires 1987; 1,000-gpd noncontact cooling water to Slip 4<br>Distributes and formulates chemical compounds (janitorial supplies, floor waxes, detergents, soaps, wall cleaner, sodium hypochlorite, aqua ammonia)<br>Inspection report (3/27/87): constructing bermed/covered area for storing flammables. Muriatic acid, alkalis, diesel fuel stored on gravel area (gravel is oil-stained) - suggested alternative storage area. Requested installation of containment at ammonium hydroxide system and higher berm around sump at end of acid plant alley. | Inspect  | Ecology            | FY 89               |
| Marine Vacuum Service              | Oil recycling facility<br>Pathway: SRO, groundwater<br>Inspection report (6/10/87): containment (concrete slab and wall) being constructed. Oil stored in uncontained plywood shack at side of shop.  |  |                    |                     |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## Problem Station DR-15 (continued)

| Potential Source   | Status   | Actions   | Responsible Entity | Implementation Date |
|--------------------|--|---|--------------------|---------------------|
| Boeing North Field | <p>Pathway: SRO, groundwater</p> <p>NPDES permit: noncontact cooling water - 150,000 gpd average; 250,000 gpd maximum</p> <p>Noncontact cooling water from air compressors discharged to Georgetown Flume until 5/87. Now discharges to Slip 4 SD (60 inches).</p> <p>SRO through oil/water separators to Slip 4 (via Slip 4 CSO/SD 117 and Slip 4 SD)</p> <p>CERCLIS site: PCB and Pb contamination in storm drain sediments</p> <p>Preliminary assessment (11/27/84): PCBs traced to ditch/pond on City Light property. Contaminated sediments and soils have been removed from flume and ditch/pond (up to borders of City Light property) (1985). City Light plans to remove flume.</p> <p>On Ecology's list of hazardous sites</p> <p>Subsurface hydrocarbon recovery system (jet fuels): one recovery well east of Buildings 318 and 319 (in Slip 4 CSO/SD basin). Began operating 5/23/86.</p> <p>PCBs: PCB-contaminated soils excavated around 3,000-gallon diesel fuel UST at Building 3-326 (site borders City Light property) during tank removal.</p> <p>RCRA status: (WAC 980 982 037) - regulated waste generator</p> <p>10/4/87: many wastes generated stored in temporary storage area; new building is in design stage (from inspection report)</p> <p>7/88: Construction completed of new storage building for regulated wastes.</p> | <p>Issue new NPDES permit</p> <p>PCBs undetected in residual oils sampled from tank</p> | Ecology            |                     |
| Michigan SD        | High priority. Offshore sediment contamination   |   |                    |                     |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

TABLE 1. (Continued)

## Problem Station DR-15

| Potential Source    | Status  | Actions                             | Responsible Entity | Implementation Date |
|---------------------|---|-------------------------------------|--------------------|---------------------|
|                     | Sediment from Station DR-16 exceeded HAET for indeno(1,2,3-c,d)pyrene. Exceeded LAET for butyl benzyl phthalate, PCBs, Zn, LPAH, and HPAH. Station DR-16 tied with Station DR-15 as highest of all Duwamish River stations for biological effects (100 percent score).  |                                     |                    |                     |
| Terminal 115        | Container terminal<br>Pathway: groundwater<br>CERCLIS site: medium priority<br>Preliminary assessment (11/27/84): problems mainly from historical operations of tenants. Recommendations: Contact previous tenant to determine closure procedures for ponds; contact Boeing about operations and waste disposal practices at Plant 1.   | Inspect, possible stormwater permit | Ecology            | FY 90               |
| Reichhold Chemicals | Low priority. Manufacturer of synthetic resins, formaldehyde, pentachlorophenol, and hydrochloric acid. Closed in 1958. Wastewater from plant discharged directly to Duwamish River until 1955<br>1955: settling basins installed for wastewater<br>1960, 1961, and 1970: aerial photos show three wastewater ponds contained by earthen dike<br>Entire site filled and paved by 1974. Now occupied by Lone Star Cement, W. Marginal Way plant. | Check closure of settling ponds     | Ecology            | FY 91               |
| S.W. Graham SD      | Low priority: no problem chemicals identified in drain sediments  |                                     |                    |                     |

NOTE: Blanks indicate items for which actions, responsible entity, or implementation dates have not been determined.  
FY 89 = 1 July 1988-30 June 1989.

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## **APPENDIX A**

### **SUMMARY EVALUATION OF KNOWN AND POTENTIAL CONTAMINANT SOURCES**

## **SUMMARY EVALUATION OF KNOWN AND POTENTIAL CONTAMINANT SOURCES**

This appendix provides a summary of the source evaluations for each high priority problem area and problem station (Figure 4) [see Tetra Tech (1988) for additional information].

### **SEATTLE SOUTH WATERFRONT PROBLEM AREA**

Decades of historical discharges of untreated sewage and industrial effluent have contributed to the extensive contamination of sediments in this area. Few industrial facilities are presently located in the area, and none have been identified as substantial sources of contamination. The most likely current sources are the Vine Street CSO (069) and King Street CSO (W028). Five other CSOs in the problem area have not been sampled but may also be sources of contamination. Other potential sources include waterfront structures and activities associated with marine transportation (e.g., pilings, accidental spills, and ship discharges of grey water and bilge water).

### **NORTH HARBOR ISLAND I PROBLEM AREA**

Todd Shipyard and Lockheed Shipyard, located adjacent to Elliott Bay and the West Waterway, are considered to be potential sources of metals and PAH in the nearby offshore sediments (especially due to historical sandblasting operations). Lead was identified as a problem chemical in many of the storm drains serving Harbor Island and has been associated with historic emissions from a secondary lead smelter that operated between 1937 and 1984. In addition, Mobil Oil (a bulk petroleum products storage facility) located on the north end of Harbor Island is considered to be a potential source of PAH. PCBs are also a problem chemical in this area, but no specific sources for this chemical have been identified. PCBs were widely used historically in electrical equipment and could have contaminated offshore sediments from various sources. Numerous private storm drains discharge into this problem area. Little is known about chemical contamination of effluent in these storm drains or potential contaminant sources in the drainage systems.

### **NORTH HARBOR ISLAND II PROBLEM AREA**

The distribution of PAH in sediments of this problem area suggests that the Wyckoff Company facility and the outflow of lower Longfellow Creek may have been significant sources of this class of compounds. In addition, lower Longfellow Creek has been identified as one source of PCBs in this problem area. PCB contamination in this problem area appears to be patchy, suggesting that there are several other potential sources of this class of compounds. Contaminated groundwater underlying the abandoned West Seattle landfill may also be a source of PAH and other extractable organic compounds, although this is not confirmed.

## WEST WATERWAY I PROBLEM AREA

The S.W. Spokane Street CSO/SD (102) is the only drain of those sampled where a relationship between contaminants (i.e., zinc and PCBs) in the receiving environment and drain sediments was observed. Other drains (and associated contaminants) discharging to the problem area are the S.W. Hinds CSO/SD (099) (4-methylphenol) and the 16th Avenue S.W. CSO/SD (104) (1-methylphenanthrene, 2-methylphenol, lead, and p,p'-DDT). The Chelan Street CSO (W036) may be a potential source of contaminants because of the presence of industrial facilities (e.g., the Wyckoff Company and Seattle Steel) in its drainage basin. However, the Chelan Street CSO (W036) was not sampled because of insufficient sediment. Several waterfront industrial facilities are identified as potential historical or current nonpoint sources of contamination based on the nature of their activities and in some cases qualitative and/or quantitative data.

## WEST WATERWAY II PROBLEM AREA

A secondary lead smelter previously located on Harbor Island is the likely primary source of lead contamination in the S.W. Lander CSO/SD (105) and in sediments on the east side of the waterway. In addition, the S.W. Florida CSO/SD (116) could have been a potential source of metals contamination in the offshore environment. Ecology has also identified the ARCO facility as a potential source of lead due to sandblast material stored onsite. The S.W. Lander CSO/SD (105) also contained high concentrations of xylene. Metals other than lead in sediments along the east side of the waterway likely originated from historical operations at the Lockheed shipyard. Specific sources of PAH and PCBs have not been identified and are likely to be more diffuse.

## DENNY WAY CSO PROBLEM AREA

The Denny Way problem area is defined by historical stations sampled by Metro (Romberg and Sumeri 1988) and Station NS-01 sampled by EPA in 1985. The chemical source analysis presented here is based solely on contamination observed at Station NS-01. This station is located in the intertidal zone north of Pier 70, less than 250 feet from the Denny Way CSO (W027), the largest and most frequent overflow site on Elliott Bay. The relative distribution of metals and LPAH in the sediments of the Denny Way CSO (W027) is similar to the relative distribution of metals and LPAH in sediments at NS-01. The relative distribution of HPAH in sediments at each location is less similar.

Known dischargers to the Denny Way CSO (W027) system include approximately 30 printers, 20 graphic and photographic shops, and 2 industrial laundries. Printing and photography operations may be historical sources of silver, and the industrial laundries may have contributed considerably to contamination by cadmium, nickel, lead, zinc, and mercury (Romberg et al. 1987). It is expected that silver reclamation at printing and photography shops and pretreatment equipment at the industrial laundries have reduced contaminant loading from these sources to the Denny Way CSO system. In addition to these sources, an electroplating shop discharging to the Denny Way system may be another source of metals.

## **PROBLEM STATION EW-05**

Station EW-05 was located in the center of the East Waterway between Terminals 25 and 30. The Hanford CSO (W032) discharges in the immediate vicinity of Station EW-05, and the relative distribution of metals in its sediments is similar to that of Station EW-05 sediments (with the exception of chromium). Sediments from both locations were significantly contaminated with PAH.

The S.W. Hanford CSO/SD (162) discharges about 500 feet upriver of Station EW-05. With the exception of copper, the relative distribution of metals in sediments from the two locations is similar. Also, the relative distribution of HPAH in sediments of the two areas is similar. Potential sources of contaminants to the S.W. Hanford CSO/SD (162) were identified based on past site visits, sampling, and inspections.

The Lander CSO (W30) is another potential source of cadmium in the vicinity of Station EW-05. Industrial facilities in the Lander CSO (W30) drainage include a metal recycler and a plating operation.

The primary sources of PCBs to Station EW-05 appear to be drains on the west side of the waterway. A metal recycler and an oil recycler are identified PCB sources within drainages to the East Waterway. PAH sources in the East Waterway include bulk petroleum storage facilities (e.g., Shell Oil and a historical Chevron facility at Terminal 30) and many diffuse sources. Phthalates were a problem chemical in sediments from Station EW-05, the S.W. Lander SD, and the Hanford CSO (W032). No sources of phthalates have been identified in the East Waterway watershed.

## **PROBLEM STATION AB-01**

Station AB-01 was located east of Duwamish Head. This station received a high score for sediment chemistry (equal to the highest station in the north Harbor Island areas). Chemical contaminants in this area included LPAH, mercury, copper, and zinc. No sources of contaminants have been identified near Problem Station AB-01. The nearest discharges to this problem station are the S.W. Fairmount SD and the S.W. Fairmount CSO (078), which both serve primarily residential areas. Contamination at this station may be due to historical shoreline activities or spills from ships.

## **PROBLEM STATION KG-01**

Problem Station KG-01 was located near the mouth of Slip 1 across from the southern end of Kellogg Island. The Brandon CSO (W041) discharges approximately 1,000 feet upstream of Station KG-01. Despite the distance between the two sites, similarity between the relative distribution of contaminants at each site suggests that the Brandon CSO (W041) may have been a source of the contamination observed at Station KG-01. Seven potential sources of metals to the Brandon CSO (W041) were identified. PAH contamination in the Brandon CSO (W041) is probably caused primarily by nonpoint sources. Other potential sources of contamination in Slip 1 include eight unidentified subtidal drains.

## **PROBLEM STATIONS KG-05 AND KG-06**

Stations KG-05 and KG-06 were approximately 550 feet apart and were located in the Duwamish River north of Kellogg Island. The Diagonal Way CSO/SD (111) and the Diagonal Avenue S. SD discharge within 1,000 feet of these problem stations. Due to dissimilarities between sediment contamination patterns in the drains and at the problem stations, these drains could not be linked to the contamination observed in offshore sediments. Two Metro CSOs (W034 and W035) also discharge in the vicinity of these problem stations. The system associated with these CSOs serves all of Harbor Island and the industrial waterfront on the west side of the Duwamish River and may be a significant transport route for contaminants.

## **PROBLEM STATION DR-12**

Station DR-12 was located in Slip 3 on the Duwamish River. The Fox S. CSO/SD (116) discharges into the Duwamish River approximately 200 feet upriver of Slip 3. Based on proximity and the close similarity in sediment chemistry between the Fox S. CSO/SD (116) and Station DR-12, it is likely that the Fox S. CSO/SD (116) is a source of sediment contamination (e.g., arsenic, zinc, copper, lead, HPAH, and LPAH) observed at Station DR-12. In addition, historical shipyard practices along the south shoreline of Slip 3 are likely responsible for metals contamination in Slip 3 sediments. No other facilities along the Slip 3 shoreline have been identified as potential contaminant sources.

## **PROBLEM STATION DR-15**

Station DR-15 was located in Slip 2 in the Duwamish River. No contaminant sources have been identified in the immediate vicinity of Station DR-15. However, the Michigan CSO (W039) and the S.W. Michigan SD (approximately 800 and 1,200 feet upriver of Station DR-15) are possible sources of some of the phthalate contamination observed at Station DR-15. This conclusion is based on the proximity of the drains to the problem station and similarities of chemical contamination between the drains and the problem station.

## **PROBLEM STATION DR-16**

Station DR-16 was located north of Terminal 115 on the western side of the Duwamish River. This station was designated as a problem because of its high score for biological indicators. Contaminants present included HPAH, butyl benzyl phthalate, PCBs, zinc, and LPAH. No ongoing potential sources have been identified in the vicinity of this problem station. The S.W. Graham SD is located less than 100 feet from Problem Station DR-16 but could not be linked to contamination observed in offshore sediments due to the observed problem chemicals in drain sediments. Historical activities in the area may have resulted in past or ongoing contaminant transport (e.g., via contaminated groundwater seepage) to the Duwamish River near Station DR-16.

## **APPENDIX B**

### **SUMMARY OF THE STATUS OF KNOWN AND POTENTIAL CONTAMINANT SOURCES**

## **SUMMARY OF THE STATUS OF KNOWN AND POTENTIAL CONTAMINANT SOURCES**

This appendix provides a summary of information about discharges and the status of activities at facilities that are known and potential sources of contamination in the Elliott Bay project area. The information presented in this appendix was compiled by Ecology staff from the agency's files. Table 1 in the main body of the report was condensed from information presented in this appendix.

## GLOSSARY AND LIST OF ABBREVIATIONS

### AGENCY AND PROGRAM NAMES

|           |   |
|-----------|---|
| CERCLIS   | Comprehensive Environmental Response, Compensation and Liability Act Information System   |
| EBAP      | Elliott Bay Action Program  |
| Ecology   | Washington Department of Ecology  |
| EPA       | U.S. Environmental Protection Agency  |
| Metro     | Municipality of Metropolitan Seattle  |
| NOV       | Notice of violation, issued to a facility when one or more regulations or requirements are violated   |
| NPDES     | National Pollutant Discharge Elimination System (EPA/Ecology)   |
| PA/SI     | Preliminary assessment/site investigation (performed under Superfund)   |
| RI        | Remedial investigation  |
| RCRA      | Resource Conservation and Recovery Act  |
| Superfund | EPA and Ecology programs under the federal Comprehensive Environmental Response, Compensation and Liability Act to clean up hazardous waste sites or other areas of toxic contamination |
| TES       | Technical Enforcement Support team (contractor to EPA) for Superfund site activities  |
| USCG      | U.S. Coast Guard  |
| WAC       | Washington Administrative Code  |

### CHEMICAL NAMES

|     |   |
|-----|---|
| Al  | Aluminum                                |
| As  | Arsenic                                 |
| BAN | Base/acid/neutral compounds (e.g., PAH) |
| CN  | Cyanide                                 |
| Cu  | Copper                                  |



|      |  |
|------|--|
| HPAH | High molecular weight polycyclic aromatic hydrocarbons |
| LPAH | Low molecular weight polycyclic aromatic hydrocarbons  |
| Pb   | Lead   |
| PCBs | Polychlorinated biphenyls                              |
| TOX  | Total halogenated organic compounds                    |
| TSS  | Total suspended solids                                 |
| Zn   | Zinc   |

#### **POLLUTANT SOURCE NAMES**

|         |  |
|---------|--|
| CB      | Catch basin  |
| CSO     | Combined sewer overflow - a discharge of raw sewage diluted with stormwater, which occurs whenever the hydraulic capacity of a combined sewer line is exceeded       |
| CSO/SD  | Combined sewer overflow and storm drain - a combined source that discharges storm drainage during low flows and raw sewage diluted with stormwater during high flows |
| G/W     | Groundwater  |
| MH      | Manhole  |
| O/W sep | Oil/water separation or oil/water separator  |
| SD      | Storm drain - a source of stormwater discharge only  |
| SRO     | Surface runoff   |
| TSD     | Treatment, storage, and disposal (of hazardous waste) facility   |
| UST     | Underground storage tank   |

#### **OTHER TERMS**

|     |  |
|-----|--|
| AET | Apparent effects threshold - chemical concentrations in sediment above which a particular adverse effect is expected to be statistically significant ( $P < 0.05$ ) relative to conditions in an appropriate uncontaminated area. Several AET (based on more than one biological effect) may be developed for a single chemical. |
| EAR | Elevation above reference - an index of toxic contamination or biological effects, which is equal to the value of a variable (e.g., chemical concentration) at a study site divided by the value of the same variable at a relatively clean reference area   |

|               |   |
|---------------|---|
| GPD or GPY    | Gallons per day or gallons per year   |
| HAET          | High apparent effects threshold - the highest of several AET developed for a single contaminant   |
| HNu           | A device for measuring combustible gas concentrations in air  |
| LAET          | Low apparent effects threshold - the lowest of several AET developed for a single contaminant   |
| mg/kg or mg/L | Milligrams per kilogram or milligrams per liter - a measure of concentration of a contaminant [also referred to as parts per million (ppm)] |
| ND            | Not detected, or below detection limits   |
| PPB           | Parts per billion (see ug/kg or ug/L)   |
| PPM           | Parts per million (see mg/kg or mg/L)   |
| ug/k or ug/L  | Micrograms per kilogram or micrograms per liter, a measure of concentration of a contaminant [also referred to as parts per billion (ppb)]  |

# SEATTLE SOUTH WATERFRONT

| POTENTIAL SOURCE   | STATUS  | ACTIONS  | IMPLEMENT DATE |
|--|---|--|----------------|
| Vine CSO (069)   | Offshore sediments at Station SS11 exceeded HAET for HPAH   | Low priority (EAR - 400; loading index - 8,080;<br>5 problem chemicals - Pb, Hg, benzyl alcohol,<br>LPAH, 2-methylphenol)<br>1988 City CSO Control Plan: reduce CSOs from 30<br>per year to 1 per year, from 3.3 Mgal/yr to<br>0.1 Mgal/yr by 2001 | 2001           |
| Metro pretreat permits<br>Queen City Plating                         | Major discharge<br>Metal finisher, 8500 gpd industrial waste, 175 gpd sanitary<br>Limits: 1.2 mg/L Cd, 6.0 mg/L Cr, 3.0 mg/L Cu, 0.6 mg/L Pb, 6.0 mg/L<br>Ni, 5 mg/L Zn, 2.0 mg/L CN<br>Hazard Waste: small quantity generator trichloroethylene liquid and<br>sludge   |  |                |
| Bavarian Meat Products<br>Dressel-Collins Fish<br>Sterling Engraving | Minor discharge<br>Minor discharge<br>Minor discharge   |  |                |
| Seattle Post-Intelligencer   | CERCLIS site - TSD facility (wastewater treatment plant discharger)<br>paper printing facility  |  |                |
| Maritime Building  | CERCLIS<br>5/1/85 preliminary assessment: unused lab storage area on 3rd floor.<br>Materials removed and shipped to Arlington in 1981 (no chemicals<br>remain)  |  |                |
| Unocal   | Pathway: groundwater<br>Ecology's hazardous waste site<br>Bulk petroleum storage facility from early 1900s to 1975<br>Spill history:<br>Tank 3634 spill: 2,500-3,000 barrels Super 76 premium leaded<br>gas at NW corner of property. All recovered<br>except 2,500-3,000 gallons.<br>Tank 3677 spill: East-central part of upper yard. 300 barrels<br>leaded regular gas in late 1960s. No recovery<br>records.<br>Truck loading line: Several hundred barrels of diesel believed to<br>have leaked from underground line (west part<br>of lower yard).<br><br>Site investigations:<br>Phase I (1981): 12 soil borings<br>Phase I (1987): 7 monitoring wells installed<br>soil cores: diesel in soil <25-1100 mg/kg<br>groundwater samples: <0.5-42.8 ug/L benzene<br><0.5-6.2 ug/L toluene<br><0.5-19.8 ug/L xylene | Remedial action required (Ecology/Unocal)<br>Remedial action plan submitted for review   | Ongoing        |

|  |   |  |         |
|--|---|--|---------|
|  | No free product reported in monitoring wells  | Phase II (1987):<br>Hydrocarbons (C7-C14): ND-5300 mg/kg (using EPA method 8015);<br>2-11,000 mg/kg (using EPA method 418.1)   |         |
|  | Remedial plan:<br>Demolish remaining structures, pull remaining tanks/subsurface installations.<br>Soils do not qualify as dangerous waste under WAC 173-303, but do<br>Work planned for late 1988-1989.  | All above ground tanks, warehouses, sheds have been removed,<br>some underground tanks and pipelines remain<br><br>Excavate/treat contaminated soils onsite. In situ<br>bioremediation of offsite areas.<br><br>qualify as problem wastes under WAC 173-304. |         |
| King CSO (W028)                        | Not sampled during EBAP.<br>Metro data shows 24.6 lb/yr Cr, 68 lb/yr Cu, 46.3 lb/yr Pb, 126 lb/yr Zn, 66 lb/yr total phthalates, 5.5 lb/yr chloroform, 3.8 lb/yr 1,2,4-trichlorobenzene, 0.2 lb/yr 1,3-dichlorobenzene, 2.9 lb/yr toluene, 1.8 lb/yr benzene, 0.2 lb/yr trichloroethylene<br>Offshore station near outfall (SS03) exceeded HAET for HPAH, Cu, Zn, benzyl alcohol, 1,4-dichlorobenzene, dimethyl phthalate   | 1988 Metro CSO control plan: reduce overflows<br>from 31 per year to 1 per year, from 70 Mgal/yr<br>to 0.5 Mgal/yr   | 2005    |
| Metro pretreat permits<br>Norfin, Inc. | Major discharge. Manufacturer of printed circuit boards<br>7,000 gpd industrial waste, 100 gpd noncontact cooling water, 750 gpd sanitary<br>Limits: 1.2 mg/L Cd, 6.0 mg/L Cr, 3.0 mg/L Cu, 0.6 mg/L Pb, 6.0 mg/L Ni, 5.0 mg/L Zn, 2.0 mg/L CN<br>Located at 526 1st Ave S until 1982 when moved to Pier 89   |  |         |
| Chromium, Inc.                         | CERCLIS, metal plating and polishing  |  |         |
| R. Breese Jones                        | Antique dealer<br>Inspect report (12/85): stripper sludges to dumpster, stripped pieces are rinsed with hose, rinsewater to combined sewer  | Referred to Metro Industrial Waste 12/85   |         |
| Seattle Steam                          | (Western Ave): NPDES for boiler continuous blowdown, boiler bottom blowdown, water softener backwash to Elliott Bay via 6" private drain at Columbia St. Flow averaged 17,992 gpd (Aug) to 50,280 gpd (Jan) in 1987. Boiler blowdown routed to sanitary as of 3/88.<br>(Post Ave): peaking plant. Usually used only Nov through Feb. Has not been used in last 3 yrs. NPDES: discharge boiler continuous blowdown (1,720 gpd boiler bottom blowdown (5 gpd), and water softener backwash (1,300 gpd) to Elliott Bay via private 6-inch drain between Union and University Streets. All flows now routed to sanitary sewer. Seattle Steam requested permit cancellation on 3/2/88. | Site inspection, review/revise permit  | FY 89   |
| Coleman Dock                           | Low priority. Potential historical sources or present sources due to past practices.  | EPA, Ecology, City, U.S. Coast Guard:<br>As sources are identified, refer to<br>PA/SI and hazard ranking. Continue<br>implementing spill prevention, control,<br>and cleanup activities.   | Ongoing |

# Alaska Ferry System Terminal

|                           |   |   |       |
|---------------------------|---|---|-------|
| Piers 37-70               |   | Metro collect and analyze sediment and evaluate potential for remedial action.  | 1988  |
|                           |   | Ecology inspect/implement BMPs. Possible stormwater permit.   | FY 90 |
| Battery CSO               | Historical CSO discharged to Elliott Bay at Battery Street until 1950s              |   |       |
| University CSO (070)      | Offshore sediments at Station SS-06 exceeded HAET for LPAH, HPAH                    | No sediment sample collected during EBAP. 1988 City of Seattle CSO control plan: partial separation, inlet modification. Reduce overflows from 2.8 Mgal/yr to 0.16 Mgal/yr with 1 overflow event per year remaining. Investigate potential sources in basin. Sample sediments in CSO. Key manhole study | 2001  |
| Madison CSOs (071/164)    | Offshore sediments at Station SS-05 exceeded HAET for LPAH, HPAH, and Ag            | Not sampled during EBAP. 1988 City of Seattle CSO control plan: partial separation, inlet modification. Reduce overflows from 0.7 Mgal/yr to 0.04 Mgal/yr with 1 overflow event per year remaining. Investigate potential sources in basin. Sample sediment in CSO. Key manhole study                   | 2001  |
| B-7<br>Columbia CSO (172) | No nearshore sediment stations. Emergency overflow only.                            | None planned.   |       |
| Washington CSO (072)      | Offshore sediments at Station SS-04 exceeded HAET for LPAH, HPAH, DDT, DDD, and DDE | Not sampled during EBAP. 1988 City of Seattle CSO control plan: partial separation, inlet modification. Reduce overflows from 0.8 Mgal/yr to 0.005 Mgal/yr with 1 overflow event per year remaining. Investigate potential sources in basin. Sample sediment in CSO. Key manhole study                  | 2001  |
| Connecticut CSO (W029)    | No nearshore sediment stations.   | Not sampled during EBAP. 1988 Metro CSO control plan: Reduce overflows from 90 Mgal/yr to 46 Mgal/yr with 5-10 overflow events per year remaining.  |       |

# NORTH HARBOR ISLAND I

| POTENTIAL SOURCE           | STATUS   | ACTIONS   | IMPLEMENT DATE |
|----------------------------|--|---|----------------|
| 11th Ave S.W. CSO/SD (077) | Emergency overflow/SD<br>EBAP data: no HAET exceedances in offshore sediments  | Low priority [EAR - 320; loading index - 84,000;<br>4 problem chemicals - Cd, Pb, fluoranthene,<br>indeno(1,2,3-c,d)pyrene] |                |
| Metro pretreat permits     |  | Implement work plan for source investigation/<br>sediment characterization (HI Superfund,<br>EPA/City)                      | 10/88          |
| Seafab                     | Major discharge<br>160,000 gpd industrial waste, 25,000 gpd sanitary waste<br>Limits (mg/L): 1 As, 3 Cd, 6 Cr, 3 Cu, 6 Ni, 3 Pb, 5 Zn<br>Treatment: battery crusher -> clarifier -> pH neutral. -> filter -><br>holding pond for reuse<br>SRO, WW from plant -> storage tank -> pH neutral. -> filter -> hold<br>pond for reuse  |   |                |
| Lockheed Plant I           | Minor discharge  |   |                |
| Puget Sound Tug and Barge  | Pathway: groundwater, SRO<br>CERCLIS: low priority<br>5/7/85 preliminary assessment: no info on presence of hazardous<br>waste; PA recommended site inspection and research of past waste<br>disposal practices  | Nothing planned by Ecology  |                |
| Texaco                     | Pathway: SRO (to WW via SW Lander CSO/SD #105) and groundwater to NHI<br>NPDES: SRO to West Waterway<br>CERCLIS: no PA in file<br>landfarming documented (EBAT)<br>Ecology's hazardous site list (WEC)<br>inspect report: complies, requested info on prod recovery wells,<br>groundwater monitoring system<br>TES: 1 dual completion well   | EPA Remedial Investigation<br>See West Waterway II for other<br>investigations by Ecology (i.e., NPDES, SRO)                | Ongoing        |
| Mobil                      | Pathway: SRO, groundwater<br>NPDES: SRO<br>Ecology's hazardous site list (WEC)<br>Inspect report--little activity, area clean, 4 tanks active<br>TES: no wells<br>EBAP data: no HAET exceedances in offshore sediments   | Ecology to update bulk petroleum storage facilities'<br>NPDES permits   | FY 89          |
| Todd                       | Pathway: SRO, fugitive emissions<br>EBAP data: Offshore sediments at Station NH-03 exceeded HAET for<br>Cu, Hg, PCBs, PAH, 4-methylphenol, DDD >HAET; Cu peak (>50% Cu)<br>New NPDES being issued<br>Current NPDES permit (expired 8/87): noncontact cooling water<br>66,000 gpd max, 70° F max<br>6/30/88: letter from Todd; noncontact cooling water discharges<br>eliminated<br>Slag: Cu slag for exterior blasting, steel shot for interiors,<br>Ni slag for Al hulls<br>Paint: Cu and Zn base<br>Lust: mineral spirits and Stoddard solvent (VOAs) tank leaks | Ecology inspect/renew NPDES permit; investigate<br>groundwater contamination (HI Superfund/Todd)                            | FY 89          |

Todd (continued)

adjacent to WW. Tanks removed 9/86. 1,2-dichloroethane, methylene Cl, benzene found in groundwater > drinking water criteria, but < ambient water quality criteria.

TES: 1 well

Storm drains (private): all CBs equipped with down turn pipe for sediment trap

SRO samples (11/20/87, 4 samples): 0.15-0.84 mg/L Cu, 0.02-0.075 mg/L Pb <0.005-0.009 mg/L Ni, 1.02-3.87 mg/L Zn

Lockheed Plant II

Pathway: SRO (private SDs), direct discharge to Elliott Bay  
NPDES expired 1980, no renewal-facility closing, equipment sold  
EBAP data: Offshore sediment at Station NH-04 exceeded HAET for Cu, As, Pb, Zn, PAH, PCB >HAET, Cu peak (>50% Cu)

Inspect reports: mostly new construction, steel parts blasted inside, exterior blasting contained using tarps, hazardous waste storage-no berm on Elliott Bay side of storage facility, not covered

Installed sediment traps, O/W separators on SDs (private) (12/85)

TES: 1 well

Ecology inspect/cancel permit; conduct soils and groundwater investigation (HI Superfund/Lockheed)

FY 89

# NORTH HARBOR ISLAND II

| POTENTIAL SOURCE       | STATUS  | ACTIONS   | IMPLEMENT DATE |
|------------------------|---|---|----------------|
| Lower Longfellow Creek | <p>Lower basin (120 acres) discharges to NHII, upper basin (1,400 acres) routed to WW via SW Hinds CSO/SD (099). High flow conditions, overtops diversion and floods Seattle Steel prop. and discharges to Elliott Bay.</p> <p>Lower basin includes: Seattle Steel (NPDES for cooling pond overflow), Purdy scrap yard (SRO, groundwater), West Seattle landfill, Zandt Brass (SRO).</p> <p>EBAP data: sample from lower Long C (at head of long pond S of SW Florida) exceeded HAET or 90th percentile for Cu, Ni, 4-methylphenol, DDT, and PCB; offshore sediments exceeded HAET for PAH, PCB, 2-methylphenol, and 2,4-dimethylphenol.</p>  | <p>Medium priority (EAR - 2,100; loading index - 162,000; 5 problem chemicals - Cu, Ni, 4-methylphenol, DDT, PCB)</p> |                |
| Purdy scrap yard       | <p>Pathway: groundwater, SRO to SW Florida CSO/SD (098) and Longfellow Creek</p> <p>Metro (10/84) traced PCB contamination in SW Florida CSO/SD (098) to Purdy property (1,000 mg/kg PCB at upstream end of CSO/SD)</p> <p>PCB contamination on Purdy property not confirmed: Seattle Steel (Hart-Crowser 1987) found PCB in soil (1/8/87) at NW corner of property 0.58 ppm, NE corner of property 16 ppm PCBs</p> <p>Metro sampling: 6/17/86 ditch to Long Creek on Purdy property:</p> <ul style="list-style-type: none"><li>bottom sediment - 2.9 mg/kg PCB</li><li>sides above tide influence - 0.86 mg/kg PCB</li><li>bottom - 3.9 mg/kg PCB</li><li>sides tidally influenced - 2.5 mg/kg PCB</li><li>west/central side of Purdy property (DM 555) - 0.19 mg/kg PCB</li></ul> <p>Inspect report (5/7/86): metals handling unsatisfactory, equipment maintenance and fueling area uncontained and poorly maintained, soils stained</p> <p>6/23/87: containment at fueling area adequate for minor spills/leaks, but not adequate for catastrophic failure, oil contaminated soils covered with crushed rock, no removal planned until Hart Crowser study completed</p> | <p>Nothing planned pending sale of property or action on West Seattle Landfill</p>                                    |                |
| Seattle Steel          | <p>Pathway: groundwater, NPDES permitted discharge to Lower Longfellow Creek</p> <p>NPDES: cooling pond overflow, expires 1988</p> <p>CERCLIS: dangerous waste pile</p> <p>10/31/84 preliminary assessment: 400 tons electric arc furnace dust in waste pile north of SW Spokane Street</p> <p>EP tox on soils: 100 mg/L Pb, 10 mg/L Cd</p> <p>groundwater: 0.35 mg/L Pb and up to 0.035 mg/L Cd, but higher concentrations measured in upgradient and downgradient wells</p> <p>9/85: Beth Steel removed 3,000 tons soil/debris (flue dust) from dangerous waste pile north of SW Spokane Street. Sent to Arlington. Excavated to background levels for Cr, Cd, and Pb.</p> <p>Electric arc furnace and new water coolant system for baghouses installed 1987. Still about 1% fugitive dust emissions uncontrolled (to Long Creek via junction box on drain near baghouse?)</p> <p>Oil problems: plans to upgrade rolling mill (major source of oils)</p>  | <p>Ecology inspect/reissue NPDES permit, sample effluent</p>  | <p>FY 90</p>   |



|                           |   |   |                  |
|---------------------------|---|---|------------------|
| Seattle Steel (continued) | Inspect reports: 6/17/87 Junction box to Long Creek full of sediment; scale pit for continuous caster modified to prevent overflows to junction box, new oil skimmer ordered for scale pit  |   |                  |
| Zandt Brass Foundry       | Pathway: SRO to Lower Longfellow Creek, groundwater<br>4/11/88 Lee Dorrigan letter: sandcasting wastes (contain metals and CNS) landfilled in back of foundry; NOV issued; initiated action for hazardous waste cleanup under 173-340 WAC. Zandt will negotiate cleanup of site   | Ecology negotiate site cleanup with Zandt                         | Ongoing          |
| West Seattle Landfill     | Pathway: groundwater, SRO to lower Longfellow Creek<br>Operated 1939-1966, 20-acre site<br>Received municipal wastes, steel mill wastes, fertilizer plant wastes, and probably other industrial waste (Seattle King County Dept. of Public Health 1984)<br>Metro found PAH, extractable organics in soil and groundwater<br>123,000 ug/L extractable organics found in groundwater<br>CERCLIS: low priority<br>11/10/84 preliminary assessment: no records indicating hazardous wastes on site. Accepted mainly municipal wastes from local waste haulers (Bayside and Sno-King Disposal Co.). Some methane levels above LEL. Methane concentrations at 27% and 60%. Non-specific trace gas at 21.6 ppm. Mud samples screened for volatiles (36 ppm) and BAN (80 ppm). Recommend further investigation on time available basis.   | Nothing planned by Ecology  |                  |
| Wyckoff                   | Pathway: groundwater, SRO to Elliott Bay and SW Florida CSO/SD (098), direct discharge to Elliott Bay<br>Metro (10/23/84) sampled SW Florida CSO/SD (098), found 30-730 mg/kg As, 207-1,000 mg/kg Cu, U-7,800 ug/kg pentachlorophenol, 2,000-147,000 ug/kg LPAH, and 3,200-300,000 ug/kg HPAH, traced contamination to CB on Wyckoff property (received overflow from hazardous waste pond)<br>EPA (1983) observed Wyckoff discharging overflow from unlined hazardous waste pond to Elliott Bay<br>6/85 Wyckoff plan to characterize extent of contamination approved by EPA<br>8/86 work stops-Wyckoff out of money to pay consultant<br>Problems with data collected by Wyckoff - inadequate QA/QC, monitoring wells screened at wrong depth to catch contaminants<br>EBAP data: offshore sediments at Station NH-06 exceed HAET/90th percentile for LPAH and HPAH<br>4/88: Ecology sampled sediments offshore of Wyckoff. North of tanks and north of fence line on east side of property looked the worst (data not in yet) sampled 2-3 monitoring wells, but did not bail before sampling<br>7/88: EPA takes over sampling at Wyckoff - soils, water, sediment, oils, and groundwater (20 monitoring wells exist on site)<br>Metro pretreatment permit (expires 1989):<br>Industrial WW 88,510 gpd 100 mg/L O & G, 1.0 mg/L As, 4.0 mg/L Cr, 3.0 mg/L Cu, 2.0 mg/L CN, 2.0 mg/L TOX<br>Sanitary WW 2,010 gpd<br>Treated SRO 86,400 gpd 100 mg/L O & G, 1.0 mg/L As, 6.0 mg/L Cr, 3.0 mg/L Cu, 2.0 mg/L CN, 2.0 mg/L TOX | Ecology inspect/issue NPDES permit<br>EPA enforce RCRA 3013 order | FY 89<br>Ongoing |

# WEST WATERWAY I

| POTENTIAL SOURCE  | STATUS   | ACTIONS  | IMPLEMENT DATE |
|---|--|--|----------------|
| SW Spokane CSO/SD (102), CSO (103), 16th Avenue SW CSO/SD (104)   | (102 and 103): offshore sediments at Station WW01 exceed HAET for benzyl alcohol. Main problem: biological hits<br>(104): offshore sediments at Station WW04 exceeded HAET for LPAH and HPAH<br>(102,104) serve as emergency overflows for southern half of Harbor Island; (103) serves as emergency overflow for all of Harbor Island<br>(102,104) serve as SDs   | City develop work plan for source investigation/ sediment characterization<br>(102): medium priority (EAR - 190; loading index - 50,700; 3 problem chemicals - Cr, Ni benzoic acid)<br>(104): medium priority (EAR - 720; loading index - 9,050; 4 problem chemicals - Pb, 2-methylphenol, 1-methylphenanthrene, DDT)<br>(103): assume medium priority (no data available) | 10/88          |
| Metro pretreatment permits  |  |  |                |
| Seafab  | Major discharge: 160,000 gpd industrial waste, 25,000 gpd sanitary. Limits (permit expired 1987): 1 mg/L As, 3 mg/L Cd, 6 mg/L Cr, 3 mg/L Cu, 6 mg/L Ni, 3 mg/L Pb, 5 mg/L Zn<br>Seafab is now authorized to discharge to sanitary (by Metro), but has no pretreatment permit<br>8/30/88 inspection: laundry, interior floor drain (by water fountain), roof drains, pot cooling water discharges direct to West Waterway via SW Lander CSO/SD (105). Toilets and showers to sanitary sewer. SRO from site collected, discharged to holding tank (treated if necessary) and discharged to sanitary sewer   | Reroute flows to sanitary sewer (Seafab/Ecology)<br>Revise Metro pretreatment permit (Seafab/Metro)<br>Comply with RCRA 3013 order to investigate soils and groundwater (Seafab/EPA)   | 10/88          |
| B-12<br>Fisher Flour<br>Pacific Rendering<br>Jacob Stern<br>Lockheed<br>Aspen Paint/Asahipen<br>America, Inc. | Minor discharge<br>Minor discharge<br>Minor discharge<br>Minor discharge<br>Minor discharge  |  |                |
| Meltec  | Manufactures machine parts from scrap steel/alloys<br>Metro inspection (7/19/84): noncontact cooling water from arc furnaces, effluent from quench tank, and SRO discharged to SW Spokane CSO/SD (102); Quench tank effluent: 9.6 ug/L As, 200 ug/L Pb   | Ecology inspect/issue NPDES permit or hookup to sanitary sewer with Metro pretreat permit.   | FY 90          |
| Mono Roofing  | Pathway: SRO to SW Spokane CSO/SD (102)<br>Operated since 1980<br>Inspections: Metro (6/12/85) collected water samples from 2 puddles and 2 CBs on site: 110 - 4,060 ug/L Cr, 110 - 16,000 ug/L Zn.<br>Ecology (10/22/85): 10,000 gal tank of clay asphalt emulsion (CAE) 2,000 gal tank of CAE, ZnO2, TiO2; SRO from site discharges to SW Spokane CSO/SD (102); washwater from trucks collected in 55 gal drums, decant to ground, sediment returned to 2,000 gal tank.<br>CB sample: 0.25 mg/L Zn; soil sample: 620 mg/kg Zn<br>4/10/86: Mono stopped using ZnO2<br>11/18/86: Turbid water discharged to West Waterway from SW Spokane CSO/SD (102) from Mono (hose connections discharged to CB) - NOV issued. | Ecology issue Administrative Order, implement BMPs   | FY 89          |

Seattle Paint/Aspen/Asahipen  
America, Inc.

CERCLIS: low priority  
Manufactures latex and alkyd type paint products (about 80% of paints  
are water base)  
Wastewater treated in series of settling tanks before discharge to  
sanitary  
Solvents reused on site, spent solvent stored until shipped to Chempro.  
6 10,000-gal UST on site: ethylene glycol, Texanol, Chevron 350B and  
410B, and linseed oil.

Nothing planned by Ecology

Fisher Flour

Pathway: private SDs  
NPDES: 75,000 gpd max: 001 - noncontact cooling water; 002 - groundwater,  
noncontact cooling water, boiler blowdown.  
Inspect reports: (12/5/85) Admin. Order to reroute boiler blowdown to  
Metro. (8/8/86): boiler blowdown routed to Metro, eliminated SD  
discharge, no longer use water to cool roller mills.  
(7/22/86): SDs sampled: 1100-8600 mg/L COD, 650-2900 mg/L TSS, no  
pesticides present in SRO.

Ecology inspect, institute BMPs

FY 89

Lockheed Plant I

See West Waterway II for description.

Columbia Cement Northwest  
(Tilbury)

Pathway: private drains  
NPDES expires 1986, renewal requested 7/86: noncontact cooling water  
truck wash water to West Waterway (26,000 gpd avg., 40,000 gpd max,  
55° F avg., 70° F max. Discharges under concrete dock slab via 1'6"  
by 2'6" concrete trench; DMRs not submitted 1/85 through 5/87  
Inspect reports: (6/10/87) pretreat system: detention trench with  
weirs for TSS removal, sorbent pads for oil, cement dust tracked  
out to street from scale and truck wash.  
cooling water (from air compressors) to concrete ditch to WWW  
groundwater (from sump pump) to second concrete ditch to WWW  
wash water to third concrete ditch to WWW.  
Filed Chapter 7 bankruptcy 2/1/88 (now Tilbury Cement)

Ecology inspect, revise/reissue NPDES permit

FY 89

Terminal 5

Pathway: SRO (private SDs), groundwater  
From 1983 - 1985 W Marginal Way S Extension project, 10,000 yd<sup>3</sup> soils  
excavated from T5 and stored at T105. Some fill used at residential  
sites in W Seattle.  
Roadway along W end of T5, between Port and Wyckoff/BN railroad (old fill)  
BN RR lines: numerous derailments reported at intersection w/26th Ave. SW  
SW corner of T5 (near Seattle/Bethlehem Steel): old fuel pipeline from  
dock to plant.  
Tested soils from 3 residential sites and T105: below dangerous waste  
criteria  
PAH: from ND to 0.25%; HH: ND to 0.0041%; pH: 5.9 - 8.0  
Some of simulated leachate tests exceeded EPA criteria for Zn, CN, DDT  
Tests for disposal at T105 (to evaluate groundwater problems).  
Roadway (Laucks 1983): 8 samples (composites of core samples, 0-12")  
CN: 7-6600 mg/kg, methyl ethyl ketone: 190-5320 ug/kg

Inspect (Ecology and Port), issue NPDES permit  
for storm drains

FY 90

Terminal 5 (continued)

Laucks/CH2M Hill data (some are composites from multiple drill holes and stations along roadway, others from residential sites, Midway landfill):

|                          |                                    |
|--------------------------|------------------------------------|
| LPAH (ug/kg):            | HPAH (ug/kg):                      |
| phenanthrene <200-35,700 | fluoranthene <200-47900            |
| anthracene <200-11800    | pyrene <200-63100                  |
| fluorene <200-2380       | benzo(a)anthracene <200-14000      |
| acenaphthene <200-1920   | chrysene <200-11000                |
| acenaphthylene <200-2000 | benzo(b+k)fluoranthene <200-40400  |
| naphthalene <200-2000    | indeno(1,2,3-c,d)pyrene <200-10400 |
|                          | dibenzo(a,h)anthracene <200-3320   |
|                          | benzo(g,h,i)perylene <200-10500    |
|                          | benzo(a)pyrene <200-32400          |

2-methylnaphthalene <200-2400 ug/kg

Fill removed from 3 residential sites in 1983 and stored at T105

Soils approved for disposal at Coal Creek landfill 8/5/86

Redevelopment completed in 1986.

Kennedy/Jenks/Chilton sampled soil beneath 2 old warehouses to be demolish as part of redevelopment (Salmon Terminal warehouse and 1 directly south of Salmon warehouse):

pH 5.1-7.0

HH <10 mg/kg (halogenated hydrocarbons; Ecology Method 83-13)

PAH <0.1 mg/kg

EP tox metals all below detection limits.

West Seattle Landfill

See Harbor Island II

Harbor Island Business Park

Pathway: groundwater, SRO

On Ecology's list of hazardous waste sites (WEC 1985), high priority

Property owned by American Marietta until 1960

1960: American Marietta merged with Martin Co. -> Martin Marietta

Basic research, production of plywood glues and proteinaceous resins.

1962: Sold to Weyerhaeuser -> United Pacific Co (Pacific Resins and Chem)

Weyerhaeuser operated research lab, Pacific Resins production facility

1965: Pacific Resins quit, dismantled equipment, sold property

1978: Weyerhaeuser sold to Seattle Iron and Metals

1981: Pacific Resins and Chemicals bought by Georgia Pacific in Tacoma

NPDES permit: 1956 - 1961: 254,000 gpd to Duwamish River

1961 - 1966: 324,000 gpd to River

1966: Permit application - no discharge, chemicals/wastes

disposed in sealed containers or in small pit on site.

Ecology and Environment (1985) site inspection: in 1980 Seattle Iron and

Metals paved over waste pit with 4" asphalt (had received about 500 mL

per day solvents, and 20 g per day waste solids).

Ecology 5/16/86 site inspection: chemical odors noted, inspector

ill (dizzy, headache, nausea).

Building inspection by Ecology (6/4-5/86): HNu readings inside 8-9 ppm, sweet

pungent odors reported, brown staining in areas where exhaust air flow

had occurred, floor tiling decomposed/dissolved in many places, drains

highly corroded, air samples collected (no formaldehyde detected).

McKinstry Company hired to seal piping in old lab portion of building:

industrial piping cut to floor line, openings plugged with concrete,

pipe exiting building cut and end plugged. Completed 1/23/87.

Investigate groundwater and soil contamination  
(EPA; Harbor Island Superfund)

Crosby and Overton

CERCLIS site

Nothing planned by Ecology

SW Hinds CSO/SD (099)

Offshore sediments at Station WW-06 exceeded HAET for LPAH. Exceeded LAET for Pb, Hg, Zn, PCBs, HPAH, and butyl benzyl phthalate.

Medium priority (EAR - 1,400; loading index - 5,530; 1 problem chemical - 4-methylphenol)  
City of Seattle drainage plan: Construct 37 AF detention basin in upper Longfellow Creek basin (at W. Seattle Golf Course), culvert/pipe replacement. Channel improvements.

1989-1998

Chelan CSO (W036)

No stations immediately offshore of CSO

No sample collected from CSO (insufficient sediment in lines).  
Metro 1988 CSO Control Plan: reduce overflows from 25 Mgal/yr to 4 Mgal/yr, from 16 events per yr to 2-5 events per yr.

# WEST WATERWAY II

| POTENTIAL SOURCE                                   | STATUS   | ACTION  | IMPLEMENT DATE   |
|--|--|---|------------------|
| SW Lander CSO/SD (105),<br>SW Florida CSO/SD (106) | (105,106): Serve as emergency overflows for north half of Harbor Island.<br>(105): Offshore sediment at Station WW14 exceeded HAET for HPAH and Pb<br>(106): Offshore sediment at Station WW18 exceeded HAET for HPAH<br>(105): SD serves 54 acres<br>(106): SD serves 40 acres  | (105): High priority (EAR - 42,000; loading index - 1,040,000; 3 problem chemicals - Sb, Pb, total xylenes). Pb concentration (52,800 mg/kg) was highest in study.<br>City of Seattle and Metro will sample 7 stations along SW Lander CSO/SD (105) to track Pb problems, use TV camera to inspect lines, plan to pave additional parking lots near old smelter to control dust, clean drain lines. Work planned as part of HI RI/FS.<br>(106): Medium priority (EAR - 150; loading index - 24,200, 2 problem chemicals - Pb, benzoic acid) | 10/88            |
| Metro pretreatment permits<br>Seafab               | Major discharge: 160,000 gpd industrial waste, 25,000 gpd sanitary waste.<br>Limits: 1 mg/L As, 3 mg/L Cd, 6 mg/L Cr, 3 mg/L Cu, 6 mg/L Ni, 3 mg/L Pb, 5 mg/L Zn.  |   |                  |
| Lockheed Shipbuilding<br>Plant 1                   | Minor discharge  |   |                  |
| B-16 Seafab  | Pathway: SRO to SW Lander CSO/SD (105), air, groundwater<br>Secondary Pb smelter since 1937. Smelting and refining operations ceased 1/84. Currently operates as Pb fabricator: Pb parts from Pb ingots: furnaces, cold rolling mill, Pb oxide plant (crushes Pb ingots with O <sub>2</sub> to form PbO <sub>2</sub> ).<br>Ownership: Northwest Pb -> Bunker Hill -> Gulf Resources -> Western Pb Products/Quemetco -> St. Joe Minerals -> RSR -> Bergsøe -> Seafab<br>CERCLIS<br>Pb main problem, but other metals (Sb, Cd) also problems (air emission, fugitive dust)<br>1975-1982 wastewater from treatment plant discharged to impoundment<br>Impoundment has permeable base.<br>Treatment plant: clarifier -> pH adjust (anhydrous ammonia) -> filtration (diatomaceous earth)<br>2/82: all wastewater from treatment plant discharged to sanitary sewer.<br>SRO from plant area: to storage tank onsite (treated if needed) to sanitary sewer.<br>1984: 250-300 tons sediment excavated from impoundment -> St. Helens smelt<br>1985: 200 tons sediment excavated from impoundment -> St. Helens smelter<br>1986: waste piles removed (battery chips, diatomaceous earth filter waste)<br>1987: NPDES permit cancelled (SRO and noncontact cooling water to sanitary EPA issued 3013 RCRA order to investigate entire site<br>1988: revised closure plan for impoundment submitted - fill, impermeable cap, groundwater monitoring, Seafab submitted plan for soil and groundwater plan for investigation of entire site, not approved yet.<br>13 monitoring wells onsite: 1984-86 data<br>pH 3.2 - 8.05<br>dissolved metals (mg/L):<br>As: 0.005-6.0<br>Cd: <0.002-0.6 | Complete closure/monitoring of impoundment (Seafab/ Ecology)<br>Seafab replumb laundry, pot room, floor drain, roof drains to sanitary sewer<br>Comply with RCRA 3013 order for soils and groundwater   | Ongoing<br>10/88 |

Seafab (continued)

Cr: <0.005-0.1  
Cu: <0.002-1.5  
Pb: <0.01-1.3  
Zn: 0.01-7.0

TES: 1 well

8/30/88 site inspection:

laundry, interior floor drain (by water fountain), roof drains, pot  
cooling water discharges to West Waterway via SW Lander CSO/SD (105)

Texaco

Pathway: SRO to SW Lander CSO/SD (105), groundwater

NPDES: SRO and tank drawdown -> oil/water separator -> SW Lander CSO/SD  
(105). expires 12/88. Violated O&G limits 11/15/86, 12/15/86,  
12/22/86 (total discharge 5300 gal), Actions: cleaned O/W sep.,  
replaced absorbent boom.

NPDES discharge sampled 4/88 (ug/L):

As: 4

Pb: 180

Zn: 193

TSS: 20 mg/L

phenol: 73

naphthalene: 67

benzene: 24.6

toluene: 12.3

total xylenes: 142

2,4-dimethyl phenol: 8.8

1,1,1-trichloroethane: 144

tetrachloroethylene: 5.2

chloroform: 6.2

1,1-dichloroethane: 0.9

2-methyl phenol: 3.8

Inspect: (12/19/85) all process area drainage to O/W sep to SD

reports boiler blowdown to sanitary

Texaco installed monitor. wells/recovery system

(6/10/87) no visible product in MWs (checked weekly)

Spills: (5/17/78) 20,000 gal AV jet A fuel spilled - 9000 gal recovered,

1500 gal evap. (9500 gal lost). Test holes showed product at 1-12".

North tank farm - diesel tank leak (NW corner of SW Florida St

and 13th Ave. SW). Product recovery conducted 12/27/85-5/5/86.

2715 gal recovered. 8/7/86 still getting 20-25 gal/week.

CERCLIS: medium priority

5/7/85 preliminary assessment: 20,000 gal AV jet fuel spill in 1978 (see

above); 6000 gal diesel spill in 1980; leaded tank bottoms landfarmed

until 1965 (now sent to Anacortes for landfarming). Recommended soil

borings to assess soil contamination, continue groundwater monitoring.

Ecology to update bulk petroleum storage facilities'

NPDES permits

EPA remedial investigation

FY 90

Ongoing

Shell

NPDES permit for treated SRO and tank water drawdown.

On Ecology's hazardous site list as high priority for petroleum (WEC)

2 outfalls: both discharge via o/w separators to SW Lander CSO SD (105)

001: SRO from truck loading and fueling areas

002: SRO from yard areas, tank water bottom drains

6/17/86 samples:

001: 2300 ug/L benzene, 130 ug/L ethyl benzene, 3600 ug/L toluene

002: 2000 ug/L benzene, <100 ug/L ethyl benzene, 1200 ug/L toluene

Truck wash to sanitary sewer, SRO from non-process areas direct to SD

(not routed through o/w separators)

Spills:

3/14/81: 21,200 gal gas (tank 26 overfilled - at NE corner of SW

Lander and 13th Ave SW). All but 6600 gal recovered/contained.

8/23/82: 4000-5000 gal gas from filter system on tanks 35 & 37

about 385 gal recovered

Ecology to update bulk petroleum storage facilities'

NPDES permits

EPA remedial investigation

FY 89

Ongoing

|                               |  |  |
|-------------------------------|--|--|
| Shell (continued)             | <p>Monitoring wells - 32 on site as of 1986<br/>         6/86: floating product reported on 6 wells (0.25-8.0"), recovery operations restarted 3/19/87. By 4/15/87, 197 gals recovered.<br/>         TES: 1 well</p>   |  |
| Pacific Wire                  | <p>Pathway: SRO, noncontact cooling water to SW Lander CSO/SD (105)<br/>         Manufactures fabricated wire products from mild and stainless steel (welded wire fabric, baskets, shelves, screens...)<br/>         NPDES permit application filed 3/24/86<br/>         3 discharges (noncontact cooling water, stormwater runoff):<br/>           #1: air compressor, resistance welders: 3780 gpd<br/>           #2: resistance welder: 4094 gpd (intermittent discharge)<br/>           #3: SRO from roof, south loading dock, driveway, parking/storage area: 4175 gal/hr (max capacity of sump pump; intermittent discharge)<br/>         Metro inspection (7/3/84): PW bought property from Lang Manufacturing (mfg. commercial ovens for restaurants) in 1967.<br/>         Waste oil recycled, plating/galvanizing waste shipped offsite, runon from Seattle Iron and Metals - to loading dock to sump to SW Lander CSO/SD (105).</p> | <p>Ecology inspect, issue NPDES permit <span style="float: right;">FY 90</span></p>  |
| Arco                          | <p>Pathway: private SDs, groundwater<br/>         NPDES (expires 1989) for SRO: 6 SDs serving parking lots and roadways untreated, 2 oil/water separators treat tank farm area (equipped with oil sensors/alarms).<br/>         Heating oil, gas, diesel, Bunker C stored on site.<br/>         Truck washwater, boiler blowdown to sanitary sewer.<br/>         6 monitoring wells on site (installed about 1969).<br/>         Inspect reports: 1985-1987 well maintained, no problems observed<br/>         1972: heavy oil reported on beach and along WW near SW Lander St., oil apparently from illegal dumping (not from ARCO), test holes dug at end of SW Lander showed oil in soil.</p>  | <p>Ecology to update bulk petroleum storage facilities' NPDES permits <span style="float: right;">FY 89</span><br/>         EPA remedial investigation <span style="float: right;">Ongoing</span></p>  |
| B-18                          |  |  |
| Lockheed Shipbuilding Plant 1 | <p>Pathway: private SDs, groundwater<br/>         NPDES expired 1980 (SRO), no renewal, facility closed.<br/>         Inspect (12/9/85): boiler blowdown to sanitary. installed O/W separators, reports particulate traps on all SDs.<br/>         Sand blast: external contained with negative pressure platforms, tarps, internal collected by vacuum.<br/>         Spent grit: taken to yard 2 for disposal (Columbia Cement in Bellingham).<br/>         No metal cleaning on site.<br/>         CERCLIS: low priority<br/>         12/3/84 preliminary assessment: no evidence of release of hazardous materials, recommended site inspection to evaluate past sandblasting operations.</p>   | <p>Ecology inspect/cancel permit <span style="float: right;">FY 89</span></p>  |
| Lockheed Shipbuilding Plant 2 | <p>See North Harbor Island 1</p>   |  |
| SW Florida CSO/SD (098)       | <p>Emergency overflow<br/>         Offshore sediment at Station WW17 exceeded HAET for HPAH<br/>         City of Seattle removed contaminated sediments from lines in 1985.</p>  | <p>High priority due to ongoing contamination from SRO from Wyckoff property (no problem chemicals near mouth since drain cleaned, but Metro found high concentrations of HPAH, LPAH, pentachloro-phenol.<br/>         Ecology to conduct source investigation in drainage basin. <span style="float: right;">FY 89</span></p> |



Metro pretreat permits:

Wyckoff

Major discharge

Permit expires 1989

Industrial: 88,510 gpd 100 mg/L O&G, 1.0 mg/L As, 4.0 mg/L Cr,  
3.0 mg/L Cu, 2.0 mg/L CN, 2.0 mg/L TOX

Sanitary: 2,010 gpd

Treated SRO: 86,400 gpd 100 mg/L O&G, 1.0 mg/L As, 6.0 mg/L Cr,  
3.0 mg/L Cu, 2.0 mg/L CN, 2.0 mg/L TOX

Aspen Industries

Manufactures thermal windows

Ecology inspect report (6/12/86): Stains on blacktop under spigot of drum  
labeled 1,1,1-trichloroethane. Staining near catch basin. Catch  
basin either connects to SW Bronson SD to Elliott Bay or to combined  
sewer on SW Harbor Ave to SW Florida CSO/SD (098).

Purdy Recycling

See North Harbor Island II

West Seattle Landfill

See North Harbor Island II

## STATION NS-01

| POTENTIAL SOURCE            | STATUS   | ACTION  | IMPLEMENT DATE |
|-----------------------------|--|---|----------------|
| Denny Way CSO (W027)        | Offshore sediments exceeded HAET for Ag  | Low priority (EAR - 210; loading index - 3,580; 3 problem chemicals - Ag, Hg, 1-methylphenanthrene)<br>Metro's 1980 CSO control plan: partial separation in Denny Local area and area tributary to Lake Union Tunnel. Reduce CSOs from 51/yr to <10/yr and flow from 370 Mgal/yr to 67 Mgal/yr. | 1993-1999      |
|                             |  | Metro remove contaminated sediment from sewer line  | 8/89           |
|                             |  | City remove contaminated sediment from sewer line   | completed 1988 |
| Metro pretreat permits      |  |   |                |
| Mastercraft Metal Finishing | Metal finishing and electroplating<br>Major discharge: 5400 gpd industrial and 210 gpd sanitary<br>Limits: 1.2 mg/L Cd, 6.0 mg/L Cr, 3.0 mg/L Cu, 0.6 mg/L Pb, 6.0 mg/L Zn, 2.0 mg/L CN.<br>Ecology and Environment inspection (1985): plating solutions/rinsates recycled, unrecyclable solutions filtered, sludges drummed. No hazard waste storage area (unlabeled drums found on site). Most of facility paved.  |   |                |
| Maryatt Laundry             | Industrial laundry<br>Major discharge: 168850 gpd industrial, 6150 gpd sanitary<br>Limits: 3.0 mg/L Cd, 6.0 mg/L Cr, 3.0 mg/L Cu, 6.0 mg/L Ni, 3.0 mg/L Pb, 5.0 mg/L Zn.<br>New pretreatment system installed 9/86:<br>cyclone separators (fine sand/grit removal) -> chemical mix (coagulant)<br>-> pH adjust (5.0) -> dissolved air flotation -> pH adjust -> sanitary solids -> filter press<br>Preliminary test show metals loading decreased: 67% Cu, 88% Pb, 18% Zn. |   |                |
| Overall Laundry             | Industrial laundry<br>Major discharge<br>See South Seattle Waterfront  |   |                |
| Queen City Plating          | Minor discharge  |   |                |
| Ashbrook Ruth Bakeries      | Minor discharge  |   |                |
| Granny Smith's Ovens        | Minor discharge  |   |                |
| Coolidge Propeller          | Minor discharge  |   |                |
| E & E Meats                 | Minor discharge  |   |                |
| Floyd Lee Color Lab         | Minor discharge  |   |                |
| Forde Motion Picture Labs   | Minor discharge  |   |                |
| Martin Tackle               | Minor discharge  |   |                |
| Pacific Northwest Bell      | Minor discharge  |   |                |
| Petschis Quality Meat       | Minor discharge  |   |                |
| Ratelco                     | Minor discharge  |   |                |
| Richardson and Holland      | Minor discharge  |   |                |
| Seattle Times               | Minor discharge  |   |                |
| United Graphics             | Minor discharge  |   |                |
| Bavarian Meat Products      | Minor discharge  |   |                |
| Consolidated Dairy          | Minor discharge  |   |                |
| Dresser-Collins Fish        | Minor discharge  |   |                |
| Mirror Like                 | Minor discharge  |   |                |

Sterling Engraving

Minor discharge

Seattle Post-Intelligencer  
Unocal

CERCLIS See South Seattle Waterfront  
Pathway: groundwater  
See South Seattle Waterfront

Maritime Building  
Dan's Paints

CERCLIS See South Seattle Waterfront

Fiberlay  
Monterey Apartments

CERCLIS

CERCLIS

Pathway: groundwater and sanitary sewer

Ecology conducting RI

FY 89

On Ecology's hazardous waste site list (WEC).

Gas infiltration into tile drain at apartment from 2 gas stations on

W. Roy St and Queen Anne N.

Product recovery well installed (by Ecology) at Arnold's Mini Mart 7/87.

Stopped 8/87 (out of \$) - only limited recovery success

Explosion monitors installed in apartment and fresh water flush maintained

Gas recovery wells reinstalled 12/87

## STATION EW-05

| POTENTIAL SOURCE                    | STATUS   | ACTION  | IMPLEMENT DATE  |
|-------------------------------------|--|---|---|
| Hanford 2 CSO (W032)                | Offshore sediments exceeded HAET for Cd, Hg, PCB, butyl benzyl phthalate, DDT, DDE, and 1-methylphenanthrene. Pb, Zn exceeded LAET. Chlordane, retene, Ag, di-n-octyl phthalate exceeded 90th percentile.  | Medium priority (EAR - 3,200; loading index - 285,000; 5 problem chemicals - Cr, Hg, 4-methylphenol, 2-methylphenanthrene, and butyl benzyl phthalate)<br>1988 Metro CSO Control Plan: reduce CSO from 270 Mgal/yr to 40 Mgal/yr. | 1986-1992   |
| Metro pretreatment permits          |  |   |   |
| Buffalo Sanitary Wipers             | Major discharge  |   |   |
| Alaskan Copper Works                | Minor discharge  |   |   |
| Booth Fisheries                     | Minor discharge  |   |   |
| C & H Sugar                         | Minor discharge  |   |   |
| Crescent Manufacturing              | Minor discharge  |   |   |
| Crowley Environmental               | Minor discharge  |   |   |
| Garrett Freight                     | Minor discharge  |   |   |
| Rainier Port Cold Storage           | Minor discharge  |   |   |
| Rainier Brewery                     | Minor discharge  |   |   |
| Ash Grove                           | Cement mfg.<br>CERCLIS<br>State groundwater permit   | Ecology inspect   | FY 90   |
| 6-22 Crowley Environmental Services | Environmental cleanup contractor<br>CERCLIS - TSD of hazardous materials (metals, oils observed)<br>RCRA status: 6/85 no longer classified as hazardous waste storage facility hazardous materials stored on site <90 days.  | Nothing planned by Ecology.   |   |
| City Light Storage                  | CERCLIS  | Nothing planned by Ecology.   |   |
| Lander CSO (W030)                   | Offshore sediment contamination at Station EW-05 (see Hanford 2 CSO W032)  | Metro: Partial sewer separation project, construct new regulator station, implement source identification/control program in service area. Low priority (EAR - 36; loading index - 7,270; 1 problem chemical - Cd)                | CSO Control 1986-1992<br>Source ID/control: 1988-1989 |
| Metro pretreatment permits          |  |   |   |
| Austin Mac                          | Major discharge<br>Inspect report (7/29/86): acid dip tank for stainless steel discharged to ground (600 - 1000 gal of acid), collected 2 sediment samples (data not in file).   |   |   |
| Industrial Plating                  | Major discharge, permit expires 1990<br>industrial wastewater: 100,000 gpd; sanitary: 2000 gpd<br>Limits: 1.0 mg/L As, 1.2 mg/L Cd, 6.0 mg/L Cr, 3.0 mg/L Cu, 0.6 mg/L Pb, 0.1 mg/L Hg, 4.1 mg/L Ni, 1.0 mg/L Ag, 4.2 mg/L Zn<br>NOV issued 4/25/88: Ni (10.8 mg/L), Cd (1.92 mg/L)<br>Ecology and Environment (1985) site inspection:<br>Operated since 1945<br>Spent solutions (plating & rinsate) to onsite WWTP: pH adjust -> clarifier (Cl and FeSO4 adds.) -> sanitary sewer.<br>Numerous permit violations for Zn and Cr reported |   |   |

K & N Meats  
Oberto Sausage

Minor discharge  
Minor discharge

Pacific Iron and Metals

Pathway: SRO  
Nonferrous and precious metals recycler, currently recycle only Al and Cu  
Operated since 1929  
SRO from site goes through two sumps/drains to city combined sewer system  
in Lander CSO (W030) service area  
PCB/Pb contamination found in 2 sumps (samples collected by EPA 3/13/86:

Nothing planned by Ecology.

|                   | EP Tox (ug/L) |         |         | PCB (ug/kg) |
|-------------------|---------------|---------|---------|-------------|
|                   | Cd            | Cu      | Pb      |             |
| sump 1 (Cu incin) | 783           | 97,200  | 152,100 | 48,000      |
| sump 2 (o/w sep)  | 743           | 8,940   | 46,600  | 183,000     |
| Al ash            | 540           | 19,080  | 6,380   | 510         |
| Cu ash            | 393           | 345,800 | 199,900 | 5,900       |
| Drain on 4th Ave  | 70            | 2,520   | 1,850   | 1,900       |

PIM received scrap computers from Boeing for recycle.  
10/86 PIM hired Terra Assoc to sample soil and groundwater under 2 sumps:  
2 soil borings: PAH, PCB in groundwater < detection limits  
Metals, PAH, PCB in soil < dangerous waste criteria  
No action required to cleanup soil and groundwater under sumps  
6/87 drain lines on property cleaned  
3" and 6" lines: pumped all CBs, cleaned all pipes with detergent,  
clean all CBs with high pressure wash and degreaser.

Terminal 30 (Chevron/Port of  
Seattle

Chevron operated tank farm from 1930s to 1985  
Port bought in 1985 to build container terminal  
Construction included:

Ecology inspect/implement BMPs, possible stormwater  
permit

FY 89

demolish tank farm  
remove timber bulkhead  
dredge soils along WAY  
place blanket clean fill (35' thick) along face of dredged area

Port of Seattle complete product recovery operations

Ongoing  
-1989

1984 Chevron/Ecology initiated product recovery program:  
As of 4/87, 142,700 gal product recovered, scheduled to continue thru  
9/88.

Free product remains in areas near recovery wells, not adjacent to EWW  
soils saturated with product isolated from waterway with clean fill.

SW Hanford CSO/SD (162)

Emergency overflow serving south end of Harbor Island. Storm drain  
basin: 70 acres.  
Contamination in offshore sediments. See Hanford2 CSO (W032)

High priority (EAR - 40,000; loading index - 1,050,000;  
9 problem chemicals - Cu, Pb, Zn, 1,4-dichloro-  
benzene, 1,2,4-trichlorobenzene, 1-methylphenan-  
threne, chlorobenzenes, PCB, and Se)  
City of Seattle to conduct source investigations in  
basin as part of Harbor Island Superfund (EPA).

10/88

Metro pretreatment permits

Seafab  
Value Metal Plating

Major discharge (See West Waterway II)  
Permit cancelled 6/85 (installed a recycling system), connection  
to sewer sealed. Discharge of 4060 gpd industrial waste.

Ecology inspect to verify no discharge.

FY 90

Fisher Mills  
Pacific Rendering  
Jacob Stern

Minor discharge  
Minor discharge  
Minor discharge

Seattle Iron and Metals

Pathway: SRO, groundwater

Metal recycler. Operated since 1949. Prior to 1949, property owned by the Navy.

Inspection reports:

Metro (2/29/84) Copper wash effluent: 248-1600 mg/L Cu, 62-74 mg/L Pb, 12.5-21.9 mg/L Zn.

Metro (1/9/85) Copper wash effluent: 16.2-18.2 mg/L Cu

Ecology (12/10/85): old batteries stored in unbermed, uncovered area; Cu ash stored in open containers in uncovered area; water from Cu rinse area discharged to SD (SW Hanford CSO/SD 162) about 1-2 times per week (max 2500 gpd) between 1974 and 1986; improper storage of waste oil and oils (uncontained); SRO collected in underground tank at north corner of lot near 11th Ave SW, Al dross landfilled (classifies as extremely hazardous waste). Administrative order issued to correct all of above. Corrections completed as reported in 2/20/86 inspect report. Dye tested CBs on property, could not trace.

Ecology/City Light (5/8/86): former primary transformer storage area located in SE quadrant of property. Secondary storage area in NW quad

SIM letter of 2/25/86: as of 1/17/86, Cu wash water no longer discharged to SD (dry methods used), Cu ash awaiting shipment now stored in covered containers, underground storage tank for SRO removed.

PCBs: SIM received transformers from City Light 9 times from 4/79-1/84. SIM reported that transformer oil usually drained before transformers received, otherwise oil drained and reclaimed by Petroleum Reclaiming Service.

EPA sampling results (7/16/86):

|                                | PCBs (mg/kg) |        |
|--------------------------------|--------------|--------|
|                                | (1254)       | (1260) |
| SD CB near Cu wire incinerator | -            | 26     |
| Cu ash                         |              |        |
| soil at waste oil tank         | 11           | -      |
| soil next to waste oil tank    | -            | 9.2    |
| soil under empty drum storage  | 12           | 4.6    |
| soil next to RR track          | 10           | 8.7    |
| soil under train engine        | -            | 2350   |
| NE corner of drainage ditch    | -            | 5.6    |

EPA sampling results (12/10/85):

SD CB near Cu wire incinerator:

water: 7.7 mg/L Cu, 2.5 mg/L Pb, 0.03 mg/L Ni, 1.4 mg/L Zn

sediment: 428,000 mg/kg Cu, 28,220 mg/kg Pb, 75 mg/kg Ni, 5560 mg/kg Zn, 15,400 ug/kg PCB

ash along rail of wash down tank: 155,800 mg/kg Cu, 18,840 mg/kg

Pb, 75 mg/kg Ni, 22,200 mg/kg Zn, 130 ug/kg PCB

Inspection reports:

3/11/88: extensive chemical spillage on floor inside (about 10 gal of Ni plating solution) and evidence of outdoor spills.

Closed loop system: parts not always drained over plating tank (spills

Chemical storage inadequate - no berms, some containers stored in unpaved area, no roof, leaking drums observed.

Penalties:

4/14/86: 4000\$ for discharging process wastes to ground, inadequate storage of dangerous wastes, exceedance of 90-day limit for storage of dangerous wastes.

Ecology issue NPDES permit with sampling requirements

FY 90

EPA investigate PCB contamination

Investigate groundwater contamination (HI Superfund)

Ecology inspect to verify no discharge

EPA remedial investigation, preliminary soil sampling

FY 90

Ongoing

Value Metal Plating

Value Metal Plating  
(continued)

2/9/78: NOV - disposed plating wastes to ground, Ecology ordered  
to connect to sanitary sewer (metro pretreat program).  
6/86: VMP installed concrete pad for storage of wastes/raw  
materials, sump cleaned out by Crosby and Overton.  
Groundwater data from well on site:  
9320 ug/L Cu, 6340 ug/L Zn, 39,000 ug/L Ni, 256 ug/L Cr, 45.6  
ug/L Cd, 21 ug/L Pb  
See West Waterway II

Harbor Island Business  
Center

Ecology inspect

FY 89

Non-Ferrous Metals

Pathway: SRO to SW Hanford CSO/SD (162)  
On Ecology's hazardous site list for metals (WEC)  
CERCLIS  
Inspect reports:  
Metro (3/20/84: CB sediment sampled: 110 mg/kg As,  
17 mg/kg Cd, 110 mg/kg Cr, 5000 mg/kg Cu, 44,000 mg/kg Pb,  
10,000 mg/kg Zn.  
Ecology (3/6/87): drums of Pb dross, fluorescent light ballast,  
transformers, Ni-Cd batteries stored on-site in uncontained area.

EPA remedial investigation

Ongoing

SW Florida SD (36")

Low priority (EAR - <1; loading index - 8;  
1 problem chemical - DDT)

Shell

SRO and tank drawdown from tank farm discharged to SW Florida in 1970s  
Portion of Tank farm on Terminal 18 demolished for container terminal  
On Ecology's hazardous site list for petroleum.

B-25

SW Lander SD (15")

Low priority (EAR - 10; loading index - 3;  
1 problem chemical - dimethyl phthalate)

Pacific Wire Works

Wire forming  
3 outfalls:  
#1 noncontact cooling water from air compressor and welders  
#2 noncontact cooling water from resistance welder  
#3 roof drain, south loading dock, driveway SRO  
Applied for NPDES permit 3/24/86, application incomplete

Ecology inspect/issue NPDES permit

FY 90

**Problem Station AB-01**

No potential sources identified



## STATION KG-01

| POTENTIAL SOURCE                                   | STATUS   | ACTION   | IMPLEMENT DATE |
|--|--|--|----------------|
| Brandon CSO (W041)                                 | No HAET exceedances in offshore sediments. LAET exceedances for Zn, Hg, HPAH, butyl benzyl phthalate. Cd, di-n-octyl phthalate exceeded the 90th percentile concentration.   | Medium priority (EAR - 11,000; loading index - 128,000; 8 problem chemicals - Cd, Pb, Se, Ni, Zn, Hg, 4-methylphenol, 2-methylnaphthalene)<br>Metro 1988 CSO Control Plan: reduce overflows from 25 events per year to 1-2 events per year and from 35 Mgal/yr to 6 Mgal/yr. | 2005           |
| Metro pretreatment permits<br>Art Brass Plating    | Major discharge<br>Electroplating with Cr, Cu, Ni, Zn, CN<br>Metro permit expires 1989: 30,000 gpd industrial waste, 980 gpd sanitary<br>Limits (mg/L): 1.2 Cd, 6.0 Cr, 3.0 Cu, 0.6 Pb, 4.1 Ni, 4.2 Zn, 1.9 CN.<br>10/29/87 Metro inspect report: drums of solvents, lacquer, thinner stored in unbermed area, evidence of spills noted.<br>11/5/84 Metro inspect: chemicals, waste barrels, unused tanks stored outside on concrete, unbermed pad with CB in middle; material was seeping towards CB; some barrels stored in unlined gravel side-portion of alley.  |  |                |
| Northwest Tank Service/<br>Northwest Enviroservice | Major discharge<br>75,000 gpd industrial waste, 270 gpd sanitary, 200 gpd stormwater runoff<br>Limits (mg/L): 1.2 Cd, 6.0 Cr, 3.0 Cu, 3.0 Pb, 6.0 Ni, 5.0 Zn, 2.0 CN, 0.1 Hg, 800 phenol, 1.0 As.<br>RCRA permitted facility<br>operated since 1969: marine and industrial disposal. Provides cleaning, waste hauling, disposal operations, receives and ships regulated hazardous wastes, stores petroleum products, treats oily wastewater, recycles solvents, and stores regulated wastes.<br>6 operational areas:<br>North yard - oil and wastewater processed to reclaim oil. Unload here.<br>Chemical processing building - houses tanks where liquid regulated wastes are treated and processed (batch)<br>East Drum covered storage area - containerized wastes: fully contained (runoff/waste routed to concrete sump)<br>South Tank farm - 8 storage tanks for product or regulated waste<br>Central storage area - chemical storage tanks.<br>Future expansion planned: storage of regulated waste drums in covered, contained storage area and lithium battery destruction in specially designed facility.<br>Part B application filed 2/18/88, but notice of deficiency issued; Ecology requested that NWE resubmit Part B approximately by 9/1/88. |  |                |
| GE Aviation  | Major discharge: aerospace parts repair and metal cleaning<br>2300 gpd industrial wastewater, 2500 gpd noncontact cooling water, 4340 gpd sanitary wastewater, 100 gpd boiler blowdown.<br>Limits (mg/L): 1.2 Cd, 6.0 Cr, 3.0 Cu, 0.6 Pb, 6.0 Ni, 1.0 Ag, 5.0 Zn, 2.0 CN, 4.57 TIO (total toxic organics), 100 O & G.  |  |                |
| International Graphics<br>Northwest Glass/Incon    | Minor discharge<br>Minor discharge   |  |                |

Northwestern Glass/Incon

NPDES permit expires 1990: glass container manufacturer  
Noncontact cooling water: 38,000 gpd (avg), temp: 72.3 of (max)  
Contaminated cooling water to sanitary sewer

Nothing planned by Ecology.

3 outfalls:

10" drain off of Fidalgo St.: noncontact cooling water + SRO from S end  
of plant.

4" drain off of Ohio Ave.: drainage/sewer plan and letter from NWG shows  
this line was sealed 7/21/86

2 SDs off of Ohio Ave: 1 from o/w separator and 1 serves Ohio Ave.

8 unidentified drains in Slip 1

EPA dive team report (7/30/85): 8 pipes found during 7/85 dive ranging  
from 6" to 2' in diameter. 2 were subtidal, 3 intertidal, 3 above high  
tide. All discharged from N side of Slip 1 by Federal Center South.

Nothing planned by Ecology.

**Problem Stations KG-05 and KG-06**

No potential sources identified

## STATION DR-12

| POTENTIAL SOURCE                                | STATUS   | ACTION          | IMPLEMENT DATE |
|---|--|-----------------|----------------|
|   | Sediment at Station DR-12 exceeded LAET for Pb, PCB, fluoranthene, indeno(1,2,3-c,d)pyrene. As, Zn, and Cu exceeded LAET and 90th percentile. No HAAET exceedances. Biological indicators of contamination (score = 75%).  |                 |                |
| Fox CSO/SD (116)                                | Emergency overflow and storm drain serving about 32 acres.<br>High priority drain [EAR - 26,000 at MH2; loading index - 329,000 at MH3; 32 problem chemicals (MH3) - As, Cu, Pb, Sb, Zn, 4-methylphenol, naphthalene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenzo(a,h)-anthracene, dibenzofuran, 2-methylnaphthalene, 1,1-biphenyl, 1-methylphenanthrene, benzofluoranthenes, indeno(1,2,3-c,d)pyrene, HPAH, LPAH, 3-methylphenanthrene, 2-methylphenanthrene, 1,1-dichloroethane, vinyl chloride, trans-1,2-dichloroethene]   |                 |                |
| Metro pretreatment permits<br>Emerson GM Diesel | Minor discharge  |                 |                |
| Tyee Lumber                                     | Wood products manufacturer<br>Inspect reports:<br>1/31/86 (Metro): warm, white liquid discharge to Fox CSO/SD (116)<br>sample: 10 ug/L Cu, <6 ug/L Cd, <20 ug/L Cr, 40 ug/L Ni, <20 ug/L Pb, 27 ug/L Zn.<br>2/5/86 (Ecology): plant operated since 1906<br>white, milky discharge from plant identified as polyvinyl acetate glue.<br>glue wash water -> ground -> settling pond -> pumped to loading bay -> overflow to Fox CSO/SD (116)<br>In 1982, CECO Corp. bought improvements on property and leased property from owner. Previous owners operated pentachlorophenol dip tank. CECO discontinued use and contracted NW Enviroservice to remove tank.<br>Lease expired 4/86. CECO moved to Lacey. Planned to remove all buildings and tanks.<br>3/25/86 (Ecology): NW Enviroservice had removed 300 gal PCP tank and collected soil samples. Ecology has been unable to obtain sample results. |                 |                |
| Inland Transportation                           | CERCLIS: waste activities record: spill, transporter, treatment  |                 |                |
| Campbell Chain                                  | Division of Cooper Industries<br>6/18/86 Ecology inspect report: SRO to Duwamish River at Slip 2. Warehouse and sales office (chains, shackles, clamps, and fittings).   |                 |                |
| Marine Power and Equipment                      | Shipyard<br>NPDES: expires 1992<br>drydock: 236,000 ft <sup>3</sup> /raising of drydock (avg) 381,000 (max)<br>10 NTU turbidity, 15 mg/L O & G<br>synchrolift: 416,000 ft <sup>3</sup> /raising of lift (avg); 665,000 (max)<br>10 NTU, 15 mg/L O&G  | Ecology inspect | FY 89          |

Marine Power and Equipment  
(continued)

pressure wash water (mg/L; avg/max): 1.5/2.4 Cu; 2.0/3.2 Ni; 0.76/1.2 Pb; 2.8/3.3 Zn.

stormwater runoff:

- 003 (avg/max): 4/24 gpm; 10/15 mg/L O&G; 45 mg/L TSS (to Head of Slip 3).
- 004 (avg/max): 2/9 gpm; 10/15 mg/L O&G; 45 mg/L TSS (to launch platform on Slip 3).
- 005 (avg/max): 4/1000 gpm; 10/15 mg/L O&G; 45 mg/L TSS (to head of launch platform on Slip 3).
- 006 (avg/max): 10/1000 gpm; 10/15 mg/L O&G; 45 mg/L TSS (to side of launch platform on Slip 3).
- 007 (avg/max): 7/200 gpm; 10/15 mg/L O&G; 45 mg/L TSS (to Fox CSO/SD).
- 008 (avg/max): 42/2000 gpm; 10/15 mg/L O&G; 45 mg/L TSS (to Fox CSO/SD).
- 009 (avg/max): 14/1000 gpm; 10/15 mg/L O&G; 45 mg/L TSS (to Fox CSO/SD).
- 010 (avg/max): 9/47 gpm; 10/15 mg/L O&G; 45 mg/L TSS (to Fox CSO/SD).

Receiving environment survey required: water and sediment samples:  
two sampling events 3 yrs apart.

BMPs: regular (i.e., monthly) cleaning of yard; inspect/clean sediment traps in drains on monthly basis; control dust/overspray from sandblast/painting operations.

Consent Decree (12/87): Requires MPE to comply with NPDES permit

Inspect reports:

1/3/86 (Ecology): spent grit vacuumed from synchrolift or manually cleaned; spent grit tested (EP tox) and sent to Kent Highlands landfill for use as daily cover.  
Hazardous waste storage area needs berm constructed on all sides and must be covered.  
Oil storage area needs modifications to contain leaks - area heavily contaminated with oils.

7/28/87 (Ecology): Catch basins cleaned on monthly basis; General yard sweeping inadequate (sandblast grit/dust present throughout yard); still no containment at oil storage area.

8/4/88 Seattle PI article: MPE Chapter 11 reorganization plan signed by U.S. judge.

## STATION DR-15

| POTENTIAL SOURCE              | STATUS   | ACTION  | IMPLEMENT DATE |
|-------------------------------|--|---|----------------|
| SW Michigan CSO (W039)        | Offshore station (DR-15 at head of Slip 2) exceeded 90th percentile concentration for di-n-octyl phthalate. Exceeded LAET for PCBs. Also high score (100%) for biological indicators of contamination.   | High priority [EAR - 14,000; loading index - 395,000; 19 problem chemicals - Cd, Pb, Ni, Hg, 4-methylphenol, acenaphthene, indeno(1,2,3-c,d) pyrene, total phthalates, 2-methylnaphthalene, 1-methylphenanthrene, LPAH, chlorobenzenes, 1,4-dichlorobenzene, 1,2-dichlorobenzene, DDE, DDT, PCB, total xylenes, butyl benzyl phthalate] |                |
|                               |  | 1988 Metro CSO control plan: reduce overflows from 31/yr to 1/yr and from 250 Mgal/yr to 1 Mgal/yr  | 2005           |
| Metro pretreatment permits    |  |   |                |
| Wearcote NW                   | Major discharge<br>Metal finishing/electroless plating<br>7475 gpd industrial waste, 525 gpd sanitary waste<br>Limits: 1.0 mg/L As, 0.11 mg/L Cd, 2.77 mg/L Cr, 3.0 mg/L Cu, 0.69 mg/L Pb, 3.98 mg/L Ni, 1.0 mg/L Ag, 2.61 mg/L Zn, 1.2 mg/L CN.   |   |                |
| Arrow Transportation          | Major discharge<br>Vehicle maintenance, tank truck cleaning<br>29,220 gpd industrial waste, 780 gpd sanitary waste<br>Limits: 100 mg/L O & G, 2.0 mg/L TOX, 4.57 mg/L BTX.   |   |                |
| Viox Corporation              | Major discharge<br>Production of radiation shielding systems and specialty glasses for electronics.<br>3200 gpd industrial waste, 6700 gpd noncontact cooling water, 1225 gpd sanitary, 8400 gpd motive power, noncontact  |   |                |
| ABC Metal Finishing           | Major discharge<br>Metal finishing<br>9685 gpd industrial waste, 315 gpd sanitary waste<br>Limits: 1.0 mg/L As, 0.11 mg/L Cd, 2.77 mg/L Cr, 3.0 mg/L Cu, 0.69 mg/L Pb, 0.1 mg/L Hg, 3.98 mg/L Ni, 0.43 mg/L Ag, 2.61 mg/L Zn, 1.2 mg/L CN.   |   |                |
| GE Aviation                   | Major discharge<br>2300 gpd industrial wastewater, 2500 gpd noncontact cooling water, 4340 gpd sanitary wastewater, 100 gpd boiler blowdown.<br>Limits (mg/L): 1.2 Cd, 6.0 Cr, 3.0 Cu, 0.6 Pb, 6.0 Ni, 1.0 Ag, 5.0 Zn, 2.0 CN, 4.57 TIO (total toxic organics), 100 O&G.   |   |                |
| And All Electrochrome         | Major discharge - permit cancelled 1985, business shutdown.<br>Electroplating with Cr, Cd, CN, Zn.<br>9500 gpd industrial waste, 1050 gpd sanitary waste.<br>Limits: 1.2 mg/L Cd, 6.0 mg/L Cr, 3.0 mg/L Cu, 0.6 mg/L Pb, 6.0 mg/L Ni, 1.0 mg/L Ag, 5.0 mg/L Zn, 2.0 mg/L CN.   |   |                |
| Chempro<br>734 S. Lucille St. | Major discharge<br>Recycles waste solvents, treats waste CN solutions, treats heavy metal wastes, consolidates/repackages non-recyclable hazardous wastes, and manufactures alkyd resins.<br>16,700 gpd industrial waste, 480 gpd sanitary waste.<br>Limits: 100 mg/L O & G, 2.0 mg/L CN, 500 ug/L TOX, 1.0 mg/L As, 3.0 mg/L Cd, 6.0 mg/L Cr, 3.0 mg/L Cu, 6.0 mg/L Ni, 3.0 mg/L Pb, 5.0 mg/L Zn. |   |                |

Chempro (continued) (16 May 1983 letter): Treated, contaminated groundwater (TCGW) discharged to Metro; 3 pumping wells to cooling tower (aeration) to sanitary sewer. TOX expected to be <50 mg/L and TOV <10 mg/L.

Kitty Cat Food Minor discharge  
Atwood Adhesives Minor discharge  
Dr. Pepper Bottling Co. Minor discharge  
International Graphics Minor discharge  
Northcoast Chemical Minor discharge  
Rainier Ice Minor discharge

Preservative Paint

Pathway: groundwater  
CERCLIS: medium priority  
(5/3/85 preliminary assessment): Operated since 1980. Manufactures and sells paint, varnish, industrial coatings.  
RCRA status: generation and temporary (90 days) storage of spent, non-halogenated solvents (about 24 ton/yr).  
groundwater on site contained 0.13 mg/L Cd, 5.1 mg/L Cr, 6.04 mg/L Cu, 1.68 mg/L Ni, 6.6 mg/L Pb, 14.3 mg/L Zn (Metro - Ray Carveth 3/29/85).  
Hazardous waste stored in contained area.

Nothing planned by Ecology.

Pioneer Enamel

CERCLIS (priority assessment: none)  
(11/84 preliminary assessment): Operated since 1979. Manufactures porcelain enamel.  
All wastes are fully contained, no history of problems, no apparent hazard.  
1982: Ecology recommended facility be removed from notifier's list.

Nothing planned by Ecology.

Chempro  
734 S. Lucille St.

Pathway: groundwater  
Inspect Report: Has active groundwater monitoring program (once per month sampling). 24 underground tanks, 4 above ground tanks being constructed to replace UST.  
SRO from site discharged to sanitary sewer (site paved).  
Ongoing groundwater pump and treatment program: discharge to sanitary sewer.  
Chempro currently negotiating 3008 Consent Order with EPA for corrective action: RCRA facility investigation required (will satisfy Part B application and comply with Superfund's offsite policy) - Work Plan to be completed by about 9/88.

EPA enforce 3008 Order

9/88

Northcoast Chemical

Pathway: SRO, groundwater  
CERCLIS: no preliminary assessment in Ecology file.  
NPDES expires 1987; 1000 gpd non-contact cooling water to Slip 4 via 15 SD  
Distributes, formulates chemical compounds (janitorial supplies, floor waxes, detergents, soaps, wall cleaners, sodium hypochlorite, aqua ammonia).  
SRO from chemical mix plant, bleach plant, dry chemical mixing plant to sanitary sewer.  
Boiler blowdown to sanitary sewer.  
Non-contact cooling water: 1) liquid plant from jacketed kettles used to cool emulsions, 2) overflow from cooling tower at aqua ammonia plant.  
Inspect report (3/27/87): constructing bermed/covered area for storing flammables. Muriatic acid, alkalis, diesel fuel stored on gravel area (gravel is oil stained) - suggested alternative storage area.  
Requested installation of containment at ammonium hydroxide system and higher berm around sump at end of acid plant alley.

Ecology inspect

FY 89

Marine Vacuum Service

Oil recycling facility  
Pathway: SRO, groundwater  
Inspect report (6/10/87): containment (concrete slab and wall) being constructed. Oil stored in uncontained plywood shack at side of shop.

Nothing planned by Ecology.

Boeing North Field

Pathway: SRO, groundwater  
NPDES: non-contact cooling water - 150,000 gpd avg., 250,000 gpd max  
70° F avg, 75° F max.  
Non contact cooling water from air compressors discharged to Georgetown Flume until 5/87. Now discharges to Slip 4 SD (60").  
SRO through o/w separators to Slip 4 (via Slip 4 CSO/SD #117 and Slip 4 SD).  
Boiler blowdown, cooling tower blowdown, sanitary waste to sanitary sewer.

Ecology issue new NPDES permit  
Investigate discharge pathways.

Application for new permit in progress.

CERCLIS: PCB and Pb contamination in storm drain sediments  
11/27/84 preliminary assessment: 15-530 mg/kg PCB and 20-430 mg/kg Pb in drain sediment (storm drain ditch, fire pit, Georgetown flume).  
Priority assessment: none  
PCBs traced to ditch/pond on City Light property. Contaminated sediments and soils have been removed from flume and ditch/pond (up to borders of City Light property, 1985). City Light plans to remove flume.

On Ecology's List of hazardous sites (WEC)

Subsurface hydrocarbon recovery system (jet fuels): 1 recovery well east of building 318 & 319 (in Slip 4 CSO/SD basin). Began operating 5/23/86  
Operated for about 2+ months (No free product found): <0.5 ug/L BTX, But jet fuels expected to have low BTX in comparison to gas.

1/22/87 groundwater sample from recovery well:

<0.5 mg/L benzene  
<0.5 mg/L toluene  
<0.5 mg/L ethylbenzene  
<1.0 mg/L m,p-xylene  
<0.5 mg/L o-xylene

PCBS: PCB contaminated soils excavated around 3000 gal diesel fuel UST at building 3-326 (site borders City Light property) during tank removal.

PCBs undetected in residual oils sampled from tank. Building 3-326 is adjacent to the PCB contaminated pond on City Light property (see above).

4 composite soil samples collected (5/21/86):

4': 40 mg/kg PCB                      12' (north): 43 mg/kg PCB  
8': 13 mg/kg PCB                      12' (south): 15 mg/kg PCB

Storm drain samples (5/14/84):

Georgetown flume at N end of building 323: 520 mg/kg PCB (1254)  
CB on E side building 3-302: 126 mg/kg PCB (1242/1254)  
MH on E side building 323: 15.1 mg/kg PCB (1242/1254)

Fire practice pit investigation: unlined pit, used for 30 yrs by Boeing and King County Fire Department.

6 soil borings drilled 7/7/83 (8' deep): Product found in 1 boring adjacent to fire pit and 2 borings adjacent to two CBs (drain to ditch/pond on City Light property).

Fire pit (0-3"): <0.05 mg/kg - 2.5 mg/kg PCB  
Drain ditch upstream of pit: 4/7 mg/kg PCB  
Drain ditch downstream of pit: 8.9 mg/kg PCB

Boeing resampled fire pit area in 8/87. Ecology has not received the results.

No action pending review of sampling results.

RCRA status: (WAC 980 982 037) - regulated waste generator

10/4/87: many wastes generated stored in temporary storage area, new building is in design stage (from inspection report).



Michigan SD

7/88: Construction of new storage building for regulatory  
wastes completed.  
Offshore sediment contamination (see Station DR-15 above)

High priority [EAR - 1,400; loading index - 3,100;  
11 problem chemicals - naphthalene, acenaphthylene,  
acenaphthene, fluorene, phenanthrene, anthracene,  
LPAH, dibenzofuran, indeno(1,2,3-c,d)pyrene, total  
phthalates, 2-methylphenol, and 2,4-dimethylphenol]

## STATION DR-16

| POTENTIAL SOURCE    | STATUS   | ACTION  | IMPLEMENT DATE |
|---------------------|--|---|----------------|
|                     | Sediment from Station DR-16 exceeded HAET for indeno(1,2,3-c,d)pyrene. Exceeded LAET for butyl benzyl phthalate, PCB, Zn, LPAH, and HPAH. Station DR-16 tied with Station DR-15 as highest of all Duwamish River stations for biological contamination (100 % score).  |   |                |
| Terminal 115        | <p>Container terminal</p> <p>Pathway: groundwater</p> <p>CERCLIS: medium priority</p> <p>11/27/84 preliminary assessment: problems mainly from historical operations of tenants.</p> <p>MRI: metal recycler</p> <p>Operated evaporation ponds for metal sludges with high Pb levels. Ponds now filled in - method of closure unknown (i.e., were sludges and contaminated soils removed?). Sludges from current tenant now shipped to landfill.</p> <p>Boeing Plant 1: Operated on south half of T115 from 1950s to 1960s. Past waste disposal practices unknown.</p> <p>PA recommendations: Contact MRI to determine closure procedures for ponds; contact Boeing about operations and waste disposal practices at Plant 1.</p> | Ecology inspect, possible stormwater permit                                   | FY 90          |
| Reichhold Chemicals | <p>Manufacturer of synthetic resins, formaldehyde, pentachlorophenol, HCl. Closed in 1958.</p> <p>Wastewater from plant discharged direct to Duwamish River until 1955. 1955: settling basins installed for wastewater</p> <p>1960, 1961, and 1970 aerial photos show 3 wastewater ponds contained by earthen dike.</p> <p>Entire site filled and paved by 1974. Now occupied by Lone Star Cement, W. Marginal Way plant.</p>  | Check closure of settling ponds. Low priority.                                | FY 91          |
| SW Graham SD        | Offshore sediment at Station DR-16 contaminated (see above)  | Low priority (no problem chemicals identified in drain sediments during EBAP) |                |

## **APPENDIX C**

### **STATUS OF NPDES-RELATED INSPECTIONS AND CONTAMINATED SITE INVESTIGATIONS**

# MPDES-RELATED INSPECTIONS

Sites within designated problem areas or problem drains

| FACILITY NAME              | ADDRESS                          | INDUSTRY TYPE                              | PERMIT NUMBER | EXPIR DATE | DOE PERMIT ACTION | DOE DATE |
|----------------------------|----------------------------------|--|---------------|------------|-------------------|----------|
| Lockheed Plants 1 & 2      | 2929 16th Ave SW/2330 SW Florida | Shipbuilding, repair                       | WA0000558     | 11/80      | cancel            | FY 89    |
| Shell                      | 2720 13th Ave SW                 | Bulk petroleum storage, distribution       | WA0003085     | 6/85       | reissue           | FY 89    |
| Columbia Cement            | 3423 Klickitat Ave SW            | Cement distribution                        | WA0001856     | 11/86      | reissue           | FY 89    |
| Todd Shipyard              | 1801 16th Ave SW                 | Shipbuilding, repair                       | WA0002615     | 8/87       | reissue           | FY 89    |
| Seattle Steel              | 8501 W Marginal Way S            | Steel manufacture                          | WA0000744     | 11/88      | reissue           | FY 90    |
| Texaco                     | 2553 13th Ave SW                 | Bulk petroleum storage, distribution       | WA0001791     | 12/88      | reissue           | FY 90    |
| ARCO                       | 1652 SW Lander St                | Bulk petroleum storage, distribution       | WA0029696     | 9/89       | inspect           | FY 89    |
| Fisher Mills               | 3235 16th Ave SW                 | Flour milling                              | WA0021351     | 1/91       | modify            | FY 89    |
| Marine Power and Equipment | 6701 Fox Ave S                   | Shipbuilding, repair                       | WA0030899     | 8/92       | inspect           | FY 89    |
| Seafab/Quemetco            | 2700 16th Ave SW                 | Fabricates lead products, mfgs. lead oxide | WA0001431     | 12/79      | cancel            | FY 89    |
| Meltec                     | 3444 13th Ave SW                 | Manufactures steel castings                | None          |            | issue             | FY 89    |
| Wyckoff                    | 2801 SW Florida St               | Wood treating                              | None          |            | issue             | FY 89    |
| Pacific Wire               | 2743 13th Ave SW                 | Fabricates wire products                   | None          |            | issue             | FY 90    |

Sites outside designated problem areas or problem drains

(Sites known or suspected of discharging contaminants not covered by MPDES permit)

| FACILITY NAME            | ADDRESS               | PERMIT NUMBER                              | EXPIR. DATE | DOE PERMIT ACTION | DOE DATE |
|--------------------------|-----------------------|--|-------------|-------------------|----------|
| Duwamish Shipyard        | 5658 W Marginal Way   | Ship repair                                | WA0030937   | issue             | FY 89    |
| Kaiser Cement/Lone Star  | 5975 E Marginal Way   | Cement manufacture                         | None        | cancel            | FY 89    |
| Rhone-Poulenc (Monsanto) | 9229 E Marginal Way S | Vanillin production                        | WA0003093   | reissue           | FY 89    |
| GATI                     | 1733 Alaskan Way S    | Bulk petroleum storage, distribution       | WA0022144   | reissue           | FY 90    |
| Ideal Basic Industries   | 5400 W Marginal Way S | Cement manufacture                         | WA0002232   | inspect           | FY 89    |
| Earle M. Jorgenson       | 8531 E Marginal Way S | Manufactures ingots, custom machined parts | WA0030783   | inspect           | FY 89    |
| Kenworth Truck           | 8801 E Marginal Way S | Truck fabrication, assembly                | WA0030791   | inspect           | FY 89    |
| Ocean Construction       | 5225 E Marginal Way S | Cement manufacture                         | WA0030945   | inspect           | FY 89    |
| Ash Grove/Lone Star      | 3801 E Marginal Way S | Cement manufacture                         | State 5162  | issue             | FY 90    |
| Ash Grove/Kaiser         | 5900 W Marginal Way S | Cement manufacture                         | WA0002259   | cancel            | FY 89    |

## CONTAMINATED SITE INVESTIGATIONS

Sites within designated problem areas or problem drains

| SITE NAME                    | ADDRESS                  | INDUSTRY TYPE                                   | ACTION    | LEAD AGENCY | STATUS  |
|------------------------------|--------------------------|---|-----------|-------------|---------|
| Harbor Island Superfund site | Harbor Island            | General industrial area                         | RI        | EPA         | ongoing |
| ARCO                         | 1652 SW Lander St        | Bulk petroleum storage, distribution            | RI        | EPA         | ongoing |
| Non Ferrous Metals           | 2905 13th Ave SW         | Metal recycler, fabricates lead weights         | RI/FS     | EPA         | ongoing |
| Shell                        | 2720 13th Ave SW         | Bulk petroleum storage, distribution            | RI        | EPA         | ongoing |
| Texaco                       | 2553 13th Ave SW         | Bulk petroleum storage, distribution            | RI        | EPA         | ongoing |
| Value Metal Plating          | 3207 11th Ave SW         | Metal plating                                   | RI        | EPA         | ongoing |
| Unocal                       | Western Ave and Broad St | Bulk petroleum storage, distribution (historic) | RI        | DOE         | ongoing |
| Wyckoff                      | 2801 SW Florida St       | Wood treating                                   | RCRA 3013 | EPA         | ongoing |

Sites outside designated problem areas or problem drains

| SITE NAME | ADDRESS | INDUSTRY TYPE | ACTION | LEAD AGENCY | STATUS |
|-----------|---------|---------------|--------|-------------|--------|
|-----------|---------|---------------|--------|-------------|--------|

Central Painting  
City of Seattle  
Kenworth Truck  
Northwest Cooperage

4749 W Marginal Way S  
W Halladay St  
8801 E Marginal Way S  
7152 1st Ave S

Paint manufacture  
Vactor truck disposal area  
Truck fabrication, assembly  
Drum cleaning and reconditioning

Remedial cleanup  
Cleanup  
RI/FS/Remedial Action Plan  
Site inspection

DOE  
DOE  
DOE  
DOE

Remedial Action Plan submitted  
Warning letter sent  
Negotiate (FY 89)  
FY 89

# HARBOR ISLAND PRP INDEX

*X = doesn't exist*

| CODE | PRP NAME  |
|------|---|
| 159  | AL BOLSER TIRE STORES. INC.   |
| 104  | ALASKA FISH FERTILIZER CO. dba MEECO MANUFACTURING CO.  |
| 137  | ALASKA HYDRO TRAIN  |
| 66   | XALASKA LUMBER AND PULP CORP. (now ALASKA PULP CORP.)   |
| 105  | AMERICAN PACIFIC CONTAINER LINE. INC.   |
| 106  | (b) (6)   |
| 1    | ARCO  |
| 62   | XARLEY CHEADLE  |
| 186  | ARMOUR OIL COMPANY  |
| 152  | XARTHUR A. RIEDEL   |
| 2    | ASAHIPEN AMERICA, INC.  |
| 67   | ASSOCIATED PETROLEUM PRODUCT, INC. dba BELL PETROLEUM   |
| 97   | ASSOCIATED SHIPBUILDERS   |
| 107  | ASSOCIATED TRANSPORTATION CENTER  |
| 108  | AUCTION SERVICES  |
| 3    | BARCO WIPER SUPPLY CO.  |
| 4    | BERG INVESTMENT CO.   |
| 5    | BERGSOE METAL CORP. C/O MR. R.A. HAYDEN   |
| 68   | BROOKS RAND, LTD.   |
| 110  | BUNKER HILL CO. C/O BUNKER HILL, LTD.   |
| 6    | BURLINGTON NORTHERN   |
| 98   | BF GOODRICH CO.   |
| 213  | CAC NORTHWEST   |
| 69   | CAMCAL COMPANY, INC.  |
| 111  | CAR SLIP CO. C/O KNAPPTON MARINE CORP.  |
| 7    | CITY OF SEATTLE - LAW DEPARTMENT  |
| 8    | CLEAN SOUND COOPERATIVE   |
| 70   | CLOUGH INDUSTRIES, INC.   |
| 201  | CLU, INC.   |
| 112  | COATES ELECTRIC MANUFACTURING   |
| 9    | COLUMBIA NORTHWEST CORP.  |
| 71   | CONTROLLED HEAT, INC.   |
| 113  | CROSBY AND OVERTON, INC.  |
| 10   | CROWLEY ENVIRONMENTAL SERVICES  |
| 11   | CROWLEY MARITIME CORP.  |
| 12   | (b) (6)   |
| 160  | (b) (6)   |
| 210  | DEPARTMENT OF NATURAL RESOURCES - AQUATIC LANDS   |
| 13   | (b) (6) <b>NOT IN AR</b>  |
| 203  | XDONALD CLOSE COMPANY, INC.<br>(see D.W. CLOSE COMPANY, INC. - PRP CODE #114,<br>and SEATTLE PROPERTIES - PRP CODE #49) |
| 72   | DRAPEMASTER   |
| 214  | DUTCH BOY PAINT   |
| 73   | DUTY FREE EXPORTS, INC.   |
| 74   | DUWAMISH WATERWAY ASSOCIATION   |

115 D.R. FISHER  
 114 D.W. CLOSE COMPANY, INC.  
 215 EAGLE CREST CONSTRUCTION CO., INC.  
 200 XEAGLE SYSTEMS  
 14 EAGLE-FICHER INDUSTRIES, INC.  
 155 (b) (6)  
 148  
 157 ERLICH HARRISON COMPANY  
 116 ESCO CORPORATION  
 15 XFISHER MILLS, INC. C/O MR. FREDRICKSON  
 75 FISHER'S BLEND CREDIT UNION  
 117 (b) (6)  
 118  
 101 FREIGHT MANAGEMENT ASSOCIATES  
 209 (b) (6)  
 119 GEMCO EQUIPMENT CO.  
 182 XGENERAL PETROLEUM CO.  
 99 GEORGIA-PACIFIC CORP.  
 76 GLOBAL DIVING & SALVAGE, INC.  
 120 GULF RESOURCES & CHEMICAL CORP.  
 17 G. AND E. NELSON C/O MR. BARNHART  
 (see NELSON IRONWORKS - PRP CODE #187)  
 77 HANJIN CONTAINER LINES, LTD.  
 19 HARBOR ISLAND MACHINE WORKS, INC.  
 96 HARBOR ISLAND MARINA ASSOCIATES  
 102 HARBOR ISLAND TRAILER REPAIR  
 121 HARBOR REAL ESTATE INVESTMENTS, INC.  
 20 HARDWARE SPECIALTY CO.  
 122 HEADQUARTERS, I CORPS AND FORT LEWIS  
 202 HOPE TRANSPORT, INC.  
 (see WASTE RECOVERY, INC. - PRP CODE #61)  
 21 (b) (6)  
 198 HUSSMAN REFRIGERATION, INC.  
 18 (b) (6)  
 123 IMAGINEERING  
 205 (b) (6)  
 78 JACOB STERN & SONS, INC.  
 125 JAPANESE SIX CONTAINER LINES C/O R. BUCHANAN  
 161 JERROLD AND THORVOLD CLAUSEN dba STARFLIGHT CASES  
 126 JIM GLASS CONSTRUCTION CO., INC.  
 217 JOE'S CAFE  
 127 (b) (6)  
 103  
 22  
 124  
 216  
 145 XJ.R. & D.A. ANDERSON  
 (see also PACIFIC RENDERING - PRP CODE #38)  
 142 (b) (6)  
 218 KERAMCO  
 23 KEY INDUSTRIES LIBERTY  
 24 KIPPER & SONS ENGINEERS, INC.  
 194 KIPPER & SONS FABRICATORS  
 (SEE KIPPER & SONS ENGINEERS, INC. - PRP CODE #24)

162 KLUICKITAT WOODWORKING  
25 KMPS AM & FM  
(also known as AFFILIATED BROADCASTING/E-Z COMMUNICATION)  
26 KNPAPTON MARITIME CORP.  
163 KRAYMER, CHIN & MAYO, INC.  
128 K. AND B. MECHANICAL CO.  
27 L & L INVESTMENT CO.  
28 LANG MANUFACTURING CO.  
29 LECKENBY CO.  
79 LEO FIX TRANSFER & STORAGE CO., INC.  
147 LILYBLAD PETROLEUM, INC.  
156 XLINE CONSTRUCTION COMPANY  
223 LITE BOCKS CONSTRUCTION  
30 LOCKHEED SHIPBUILDING & CONSTRUCTION CO.  
31 LONE STAR INDUSTRIES, INC.  
195 LUNDBERG CONSTRUCTION CO.  
33 (b) (6)  
164 MARINE & INDUSTRIAL SUPPLY, INC.  
(now dba M&I, INC.)  
165 (b) (6)  
134 MARTIN/AMERICAN MARIETTA CORP.  
130 MATSON TERMINALS, INC.  
166 MAY & SMITH CO.  
80 MAZA INVESTMENTS dba LOGOS UNLIMITED  
81 MCCALL OIL AND CHEMICAL CORP.  
184 MEECO MANUFACTURING, INC.  
131 MELTEC, INC.  
(see also NIW, INC. PRP CODE #35)  
136 MILAN MOSS  
(see SAWDUST SUPPLY CO., INC. PRP CODE #135)  
34 MOBIL OIL CORP.  
82 MONO ROOFING CO.  
191 MYERS PACIFIC CO.  
167 MYRTLE HEDLUND & MARGARET SISTIG  
32 (b) (6)  
190 (b) (6)  
PRP CODE #32)  
63 M.R. BUTLER CONSTRUCTION CO.  
(see M.P. BUTLER - PRP CODE #32)  
129 M.V.R. CONSTRUCTION CO.  
35 N I W, INC.  
168 NC MACHINERY CO.  
187 NELSON IRONWORKS, INC.  
188 NIFTY'S RESTAURANT  
140 NL INDUSTRIES, INC.  
36 NON-FERROUS METALS, INC./HARBOR ISLAND SUPPLY  
83 NORTHWEST HOUSE WRIGHTS, INC.  
219 NORTHWEST HOVER CRAFT  
84 OLYMPIC PIPE LINE CO.  
143 OWENS/CORNING FIBERGLASS  
141 PACIFIC AGRO CO.  
169 PACIFIC FABRICATORS, INC.  
37 PACIFIC MOLASSES CO.  
109 XPACIFIC RAILWAY SUPPLY CO.



38 PACIFIC RENDERING CO.  
 211 PACIFIC RESINS & CHEMICALS, INC.  
 (see also UNIVAR - PRP CODE #177 &  
 GEORGIA-PACIFIC - PRP CODE #99 & WEYERHAEUSER CO. -  
 PRP CODE #59 & MARTIN/AMERICAN MARRIETTA - PRP CODE #134  
 & SEATTLE STEVEDORE - PRP CODE #50 & SHALMAR CORP. -  
 PRP CODE # 51)  
 170 PACIFIC WESTERN AGENCIES, INC.  
 85 PACIFIC WIRE WORKS  
 86 PARK DEVELOPMENT CO.  
 138 (b) (6)  
 39 PEOPLES NATIONAL BANK TRUST DIVISION  
 87 PERFORMANCE CONTRACTING, INC.  
 88 PILGRIM PET SUPPLY, INC.  
 40 PIONEER CONSTRUCTION MATERIALS CO.  
 41 PORT OF SEATTLE  
 204 PROPOSAL RESEARCH AND DEVELOPMENT CO.  
 42 PRUZAN BUILDING CO.  
 189 X PUGET SOUND BRIDGE & DREDGE CO.  
 (see LOCKHEED SHIPBUILDING & CONSTRUCTION CO. -  
 PRP CODE #30)  
 89 PUGET SOUND TUG & BARGE  
 43 QUEMETCO REALTY, INC.  
 212 QUEMETCO, INC. (previously WESTERN LEAD PRODUCTS)  
 44 R & U, INC.  
 90 RAINIER SERVICE AUTO REPAIR  
 171 RANDOLPH CONSTRUCTION, INC.  
 197 RASMUSSEN CO., INC.  
 144 (b) (6)  
 172 RAYTHEON SERVICE CO.  
 139 REIDEL INTERNATIONAL, INC.  
 91 REKORTAN SPORTS CORP.  
 45 (b) (6)  
 224 (b) (6)  
 92 ROCKY KUEHNY dba WOODMASTERS  
 220 (b) (6)  
 153 SAFWAY STEEL PRODUCTS  
 135 SAWDUST SUPPLY CO., INC.  
 46 SEAFAB METAL CORP.  
 93 SEAPORT PETROLEUM  
 (currently dba COLLIN OIL CO.)  
 221 SEASPAN INTERNATIONAL  
 196 X SEATTLE AMERICAN DISTRICT TELEGRAPH CO.  
 133 SEATTLE CRESCENT CONTAINER SERVICE  
 47 SEATTLE FOUNDRY CO., INC.  
 (see also NIW, INC. - PRP CODE #35)  
 48 SEATTLE IRON & METALS CORP.  
 49 SEATTLE PROPERTIES  
 206 SEATTLE SCAFFOLDING CO., INC.  
 50 SEATTLE STEVEDORE CO.  
 199 X SEATTLE TACOMA SHIPBUILDING CORP.  
 173 SEATTLE-FIRST NATIONAL BANK  
 51 SHALMAR GROUP  
 149 SHAUGHNESSY & COMPANY, INC.

52 SHELL OIL CO.  
64 SHULTZ DISTRIBUTING, INC.  
185 SMITH-BERGER MANUFACTURING CO.  
181 SOCONY MOBIL OIL CO.  
150 SOLOMON SHIPPERS SUPPLIES, INC.  
100 SPANISH AMERICAN RADIO CORP.  
154 XSTATE FUEL COMPANY  
174 STATES STEAMSHIP CO. dba LYKES BROS. STEAMSHIP CO.  
53 ST. JOE MINERALS  
151 TEMPAC HANDLING AND DISTRIBUTION, INC.  
192 XTENNENT STEEL CASTINGS CO.  
175 TERRY DREXLER (PACIFIC VACUUM & GOLDEN PENN OIL CO.)  
54 TEXACO, INC.  
55 THOMAS LTD. FAMILY PARTNERSHIP  
56 TODD SHIPYARD CORP.  
176 TRANSFRESH CORP.  
57 UNION PACIFIC RAILROAD CO.  
208 XUNION STEEL MANUFACTURING CO.  
177 UNIVAR CORP.  
158 XU.S. ARMY  
94 U.S. CUSTOMS OFFICE DISTRICT COUNSEL  
178 U.S. GYPSUM  
58 VALUE METAL PLATING  
146 V. MCALISTER  
(see LANG MANUFACTURING - PRP CODE #28)  
222 WASHINGTON INDUSTRIAL AND MEDICAL CLINIC  
183 XWASHINGTON IRON WORKS  
61 WASTE RECOVERY, INC.  
179 WESTERN QUEMETCO C/O QUENELL ENTERPRISES  
132 WESTERN SUPPLY  
59 WEYERHAEUSER COMPANY  
180 WILBUR ELLIS CO.  
65 (b) (6)  
95  
60 WYATT ENGINEERS, INC.  
193 XWYATT & KIPPER ENGINEERS, INC.  
207 X(b) (6)